Gas Journal

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Editorial Notes

Coke Making and Selling

THE Annual Meeting and Dinner of the Coke Oven Managers' Association last week marked the twenty-first anniversary of the formation of the Association. At its coming-of-age the Association finds itself in a strong position, and can reflect upon much consolidation and research work for which it has been responsible and which has had such a marked influence on the outlook of the coke oven manager and the quality of the products he manufactures. During this period, and more particularly, of course, in recent years, coke oven interests have drawn closer to the Gas Industry. Coke oven gas for domestic and manufacturing purposes is being purchased in increasing quantities by gas undertakings and with an increasing sense of security in the continuity of the supply—a matter of first importance to our Industry. This utilization of gas which formerly was burned to waste has been of benefit to all concerned, and further progress in this direction is certain.

To-day the Coke Oven Industry is on a wave of prosperity due to the great activities of the steel industry in connection with the manufacture of armaments. New batteries of ovens embodying the results of experience and investigation over many years are being erected to meet the enormous demand for furnace coke. These ovens and their method of operation are of a very different standard from those built at the time the Coke Oven Managers' Association came into being. The whole technique of the carbonization of coal in ovens and the recovery and treatment of gas, coke, and other bye-products has been entirely altered. The modern coke oven is a highly flexible carbonizing unit capable of producing widely differing types of solid smokeless fuel. At the moment the object is, of course, to manufacture a coke best suited to the needs of the steel industry—a coke having characteristics which render it unsuitable for many domestic purposes. The mode of working could, however, readily be adjusted to produce a coke of very different properties. Thanks to munition activities some 3¼ million tons of coke oven coke, previously competing with gas coke in the domestic and small industrial market, has been withdrawn to fill the requirements of the steel industry. We cannot believe, however, that the Coke Oven Industry has any desire to abandon the domestic market which, cultivated by the Gas Industry and to some extent by other suppliers of solid smokeless fuel, it has supplied during the recent lean years. We have referred to this matter before, and we do so again without offering excuse, for the problem is most decidedly a serious one. It is by no means difficult to visualize the position which would arise if in the future there should be a slackening in the demand for coke by the steel industry or when the production from new coke oven plant now being installed begins to be felt. The surplus coke would inevitably return to the domestic and industrial market.

Safeguard Needed

WITHOUT safeguard, the stability of the general coke market will be upset; and the time for our Industry to organize for the protection of its coke sales is now, and not when the potential danger materializes. Consolidation is needed at the present juncture. Co-ordination in the way we have suggested in these columns, by district coke associations linked together through one centre, is the preparation we ought to make to meet probable contingencies in the future. The problems, it is true, vary considerably in different parts of the country, but if tackled resolutely there appears no good reason why they should not be solved successfully as have those of the coke markets of London and the Home Counties. And in the planning of these schemes co-operation of the Coke Oven Industry should be sought. We recorded in the "JOURNAL" a few weeks ago the progress made in the North-East Coast district. There all the producers of coke—oven coke and gas coke—have formed themselves into "The North-East Coast Coke Producers' Association" for the purpose of marketing their coke to the best advantage. The experience of this organization, which has operated for only a comparatively short period, a matter of months, has emphasized the desirability of working in co-operation rather than in antagonism.

In his Presidential Address to the Coke Oven Man-

agers' Association Mr. T. Johnson—who incidentally mentions that at the moment he is concerned with the smooth operation of a new coke oven plant in the North carbonizing 20,000 tons of coal per week—contrasts the present standard of working of the Coke Oven Industry with that which obtained when the Association was formed. He speaks of the knowledge which has been acquired on the blending of coals and of coals and coke breeze—in which regard valuable work has been carried out by the Coke Research Committees in recent years—on refractory materials, on the control of cracking of the gases evolved from the coal, on the handling of coke, and so on. In dealing with coke preparation Mr. Johnson significantly remarks that "many coke screening plants are so arranged that the whole of the production from the ovens can be disposed of in the domestic market, if and when required." But the outstanding impression of those who heard and those who will read the Address must be the similarity of the technical problems which confront the Coke Oven Industry and those with which the Gas Industry is concerned. This similarity in engineering and chemical technique was commented on by Mr. Stephen Lacey, President of The Institution of Gas Engineers, in his speech at the annual dinner of the Association; and it is this similarity which makes all the more obvious the benefits to be gained by co-operation between the two great carbonizing industries.

Oil from Coal

Recently the Secretary for Mines, Captain Crookshank, received a deputation from the coal industry, led by Sir Evan Williams, President of the Mining Association, on the subject of fuel and defence, the object of the deputation being to stress the importance of encouraging the use of coal and its derivatives as alternatives to liquid fuel. Among the measures proposed was the establishment of at least a further twelve plants for the production of oil from coal and the encouragement of the vehicle driven on compressed gas. Reference was made to what Germany is doing in both these respects. The policy of the German Government was also commented on by Sir Philip Dawson in his Presidential Address to the Institute of Fuel. While Germany is alive to the situation and is taking active means to meet it, we in this country, he maintains, are not doing anything like enough. In 1936 it is estimated that in Germany 2,100,000 tons of synthetic light motor fuel will be consumed, of which 1,235,000 tons will be home produced; and to encourage the use of home production Germany imposes an admixture of 10% of alcohol to all light motor fuels sold for internal combustion engines. At the moment plant operating on the Fischer-Tröpsch process is being installed on a large scale in Germany for the production of oil from coal. The total output of the plants in operation and in course of erection will be 175,000 tons of spirit per annum. In 1935 the German Government prescribed that 25% of all municipally-owned heavy vehicles must operate with home-produced fuel, and a reduction in taxation was also granted to privately-owned vehicles burning it.

In the production of oil from coal, and in the replacement of imported fuel oil by products derived from coal, the carbonizing industries in Great Britain are capable of playing the major rôle. The Gas Industry is, of course, extracting benzole, though only up to 50% of the total possible production of our gas-works. It is also supplying creosote in increasing quantities for hydrogenation into petrol. When, however, we regard the possibilities of the production not only of petrol and fuel oils from coke, but also of lubricating oils, the quantity of home produced oils at present being made appears exceedingly small; and it is of the utmost importance that the possibilities of the Gas Industry in the production of oils should be impressed upon all concerned. The history of the development in Germany of the production of oils from water gas was outlined at the annual meeting of the Institute of Fuel by Professor Fischer in his Melchett Lecture, and the story is a fascinating one. A substantial extract from the Lecture is published in the "Journal" to-day. Professor Fischer does not consider the economic aspect of the process, but he points to its extraordinary flexibility in the manufacture of petrol, diesel oil, paraffin waxes, and lubricating oils. Moreover, the acetylene required for the manufacture of synthetic rubber can be obtained easily from water gas, and another possibility lies in the production of carbon black.

The Lurgi Process

At the Annual Dinner of the Institute of Fuel, which, as usual, was a thoroughly enjoyable affair, Sir Philip Dawson presented Professor Fischer with the Melchett Medal. The other presentation at the same function was the Institute's Student Medal to Dr. H. C. Millett, who, as Institution Gas Research Fellow, has carried out such excellent work on the influence of furnace atmospheres on the scaling of steel. Dr. Millett won his award by a contribution on the Lurgi process for the complete gasification of coal with oxygen under pressure—a process of first-rate interest to our Industry. The subject in general is, of course, being investigated by the Joint Research Committee of The Institution of Gas Engineers and Leeds University, and a Report is to be submitted at the Research Meeting of the Institution next week. Although the use of oxygen in processes of complete gasification has long continued to receive active consideration, comparatively little commercial and technical development has taken place, mainly on account of the high cost of oxygen and the comparatively low calorific value of the gas obtained as compared with that of normal town gas. Interest of a more practical nature has, however, been aroused by recent experiments in Germany which have shown that when the gasification in a mixture of steam and oxygen is effected at pressures of 20 to 30 atmospheres a gas is obtained which, after removal of carbon dioxide, is comparable with town gas in composition, specific gravity, and calorific value. Furthermore, the possibility of using oxygen has been increased by the recent development of the Linde-Fränkl process for oxygen production, whereby oxygen may be manufactured in quantity at materially reduced cost.

The use of high pressure, while primarily considered as an aid to methane synthesis, is also accompanied by other advantages. High pressure favours the formation of carbon dioxide in preference to carbon monoxide, and reduces the oxygen requirements of the process. The carbon dioxide can be readily removed from the gas while in a highly compressed state by simple scrubbing with water. The purification of the gas is simplified, for this washing with water also removes some 90 to 95% of the hydrogen sulphide at the same time. Another advantage is that the ground space occupied by the generator and purification plant is greatly reduced. Ex-

periments by the Lurgi Company in Germany on a plant having an output of 700,000 cu.ft. of gas a day have culminated in the erection of the first commercial plant for the complete gasification of coal—in this case lignite—with oxygen under pressure. Here again the Author does not consider the economics of the process in relation to methods of town gas manufacture as practised in this country to-day. Nor does he consider any of the disadvantages of high-pressure working. The process has, however, interest in the possibility of the future demand for gas in this country seriously outstripping the demand for coke.

Sales Organization

A STRAIGHTFORWARD account of the results which follow organization for sales and service was given by Mr. T. Reynolds last week at the meeting of the Manchester District Association of Gas Engineers. His story relates to what he has achieved at Stockport in the course of a short period by wholesale planning put into effect with determination and enthusiasm. Prior to 1930 the sales side of the Stockport Gas Department was undeveloped. There was no sales section and there were no showroom facilities; business was, in fact, conducted casually. The business which the establishment of a live sales organization would make possible of achievement was apparent, but it was equally apparent that before selling campaigns were launched an ample supply of gas at adequate pressure at all times and in all parts of the area of supply was essential. This was Mr. Reynolds' first task. While ensuring this, he put in hand the reorganization of the distribution and sales staff, and, in his own words, drastic alteration in the method of working had to be made. This development was carried out in a thorough manner, and the details of the various schemes described in the Paper should prove of help and act as an incentive to others. The whole of the reorganization of the sales department came into operation in January of this year. That it is effective can be seen from the figures given by Mr. Reynolds. Central showrooms have been made the hub of development, and as indication of business done it may be mentioned that, without taking into account simple hire, sales of appliances jumped from £8,210 in 1930 to £43,339 in 1935. Some of the factors which have contributed to this expansion are touched upon by Mr. Reynolds; and we regard as being not the least important the practical encouragement given to all employed by the Undertaking to become active salesmen for the Department.

Good service after sales, the erection of showrooms and demonstration theatres to afford the public facilities of becoming acquainted with what gas can accomplish with such economy of time and money, are necessary if our Industry is to effect a full measure of progress. The Paper by Mr. Reynolds supplies an answer to the possible question whether it pays to spend money on showrooms and cookery demonstrations. The same answer was given by both Mr. S. E. Knowles, of the Eastbourne Gas Company, and Mr. A. L. Morris, of the Cheltenham and District Gas Company, in their contributions at the recent Conference of the British Commercial Gas Association. In regard to Eastbourne, the year 1930 brought the commencement of a period of financial depression, and the effect was immediate. The prosperity of the town was reduced, and there was the inevitable reduction in the demand for gas. It was at this juncture that the showrooms were re-designed and enlarged, and, in 1932, a demonstration theatre was erected.

Paying Propositions

AT this juncture, too, electrical competition became particularly severe—people in Eastbourne were getting an "electricity complex." The action of the Gas Company, however, demonstrated to the residents the faith of the Directors in the future of gas, and the complex has largely faded. "Gas-mindedness" has in large measure taken its place, and as some indication of what users think of electricity Mr. Knowles mentions that during the past nine months over 500 gas hotplates have been placed on hire in houses equipped with electric cookers. Do showrooms pay? In 1934 the Eastbourne Gas Company purchased the share capital of the Heathfield Company and at once took steps to erect adequate showrooms. Since then sales in the area have increased by 30% and are growing apace. Last year the Undertaking at Seaford was absorbed by Eastbourne. A valuable site has been acquired for the erection of new showrooms and a demonstration theatre. And believing that the provision of a showroom in the midst of a developing area should precede the actual requirements the Eastbourne Company has opened a new showroom in the western district of Eastbourne, while plans are already prepared for a new showroom in the eastern district of the town.

The value of mobile showrooms as addition to permanent premises was well brought out in the Paper by Mr. Morris. The Cheltenham Company is able to obtain the services of the Severn Valley travelling showroom and motor showroom, which vehicles are staffed by efficient salesmen; and in new neighbourhoods it is by no means unusual for the sales of appliances in small country villages to amount to £100 a week. It is modern service that popularizes gas in the villages as, indeed, anywhere else. A striking example of the popularity of gas in an electric village is given by Mr. Morris. For four years electricity had a free field without competition. In 1933 a canvass was made. The results proved satisfactory and the extension of gas supply was carried out. To-day, well over 90% of the houses in the parish are users of gas, which, of course, proves that there is plenty of business if only we go out for it. Electric appliances, particularly cookers, are being replaced by modern gas equipment, of which the majority of the residents had hitherto been ignorant.

A National Fuel Policy

IN February last P.E.P., the organization engaged in the study of Political and Economic Planning, published a report offering suggestions regarding the reorganization of the coal industry, and the report received considerable attention in the Press. This month P.E.P. has issued a broadsheet in which proposals are set out for the future structure and development of the Gas Industry. It follows closely on the Report to the Ministry of Transport of the Committee on Electricity Distribution, and the proposals of P.E.P. relating to gas show similarity to those put forward by the Committee in regard to electricity. It will, we suggest, be of interest to our readers if we outline the main proposals of Political and Economic Planning. What is needed if the Gas Industry is to enjoy continued prosperity, P.E.P. maintains, is a long-term national policy; individual working in isolation will lead nowhere. There is need for the grouping of gas undertakings on a regional basis with national co-ordination. Grouping has, of course, taken place to a considerable extent, accelerated during the past few

years, and this grouping is being continued; but P.E.P. regards the activities of the holding companies and of other systems of amalgamation and joint working which have been practised as insufficient.

The view is put forward that the way to tackle reorganization of the Gas Industry, which "cannot afford to be placed in a position relatively less favourable than that of its chief competitor and of its chief supplier," is to establish a Gas Development Authority working through a Central Board and Regional Development Boards. The first task would be to divide up the country into areas on the basis of which reorganization and grouping could economically take place. The position would then be surveyed in each region, and steps could be taken by the Authority and the Regional Development Boards to bring reorganization about. The functions of the Authority would be, first, to promote joint working either by amalgamation—large undertakings buying up neighbouring small undertakings—by grouping under the control of holding companies, by the control of small contiguous municipal undertakings by a large municipal undertaking on behalf of a Joint Board, or by a Joint Gas Authority owning and controlling ex-company and ex-municipal undertakings in a given area. Which of the methods was to be preferred would be a matter for the Authority to decide once the position in each area had been surveyed. A further task would be the encouragement of various common activities of the Industry, such as joint technical advisory committees, schemes similar to the present Industrial Gas Development Centres, tar pools, coke associations, and regional and national advertising campaigns. Further, the Authority would supervise the raising of capital and would advise on its use.

Such a plan would require the organization of a tribunal to act as a judicial body and court of appeal, and whose sanction would be necessary for all proposals put forward by the Gas Development Authority. This need, P.E.P. suggests, could be met by the appointment of Gas Commissioners, who should take over the powers of the Gas Department of the Board of Trade. It is one thing, of course, to write about all these Authorities; it would be another matter were the attempt made to put such proposals into effect.

Personal

On Wednesday, Oct. 21, the marriage took place of Peta, daughter of Mr. and Mrs. Cyril Davis, to Mr. Anthony Crisp Stocker, 13th/18th Royal Hussars (Q.M.O.). The wedding was to have been at St. Margaret's, Westminster, but, owing to the death of Canon Carnegie, took place at Holy Trinity, Sloane Street. A very large number of guests was present, and after the ceremony there was a reception at Claridge's.

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At the Seventy-Sixth Ordinary General Meeting of the Milnthorpe Gas Company, Mr. ROBERT HAYES having notified his intention to retire from the post of Secretary to the Company whom he has served for forty-seven years, it was resolved to record an appreciation of his loyal and conscientious service on the minutes.

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Mr. JOHN R. WOOD, Chemist and Draughtsman to the Farnworth and Kearsley Gas Company, has been appointed Manager of the gas undertaking recently purchased under Act of Parliament by Dalton-in-Furness District Council. He has been in the service of the Farnworth and Kearsley Company for over twenty-one years.

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At a Board Meeting of the Slough Gas and Coke Company, held on Tuesday, Oct. 20, Mr. HURDMAN WILKINSON, Engineer and Manager of the Company, was presented by the Directors with a suitable gift in recognition of his twenty-five years' service with the Company.

Obituary

The death occurred on Oct. 13 in an Edinburgh nursing home of Mr. ROBERT SIMPSON, Chairman of the Bo'ness Gas Light Company, and an ex-Provost of Bo'ness. He was 74 years of age. Mr. Simpson had nearly thirty years' service with the Town Council.

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The death occurred in Dublin recently of Mr. DAVID RENWICK ANTHONY, Superintending Engineer to the Alliance and Dublin Consumers' Gas Company. He was well known in engineering and shipping circles, being for many years in the service of the Dublin and Docks Board as Marine Surveyor.

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The death has occurred of Mr. J. MORTON LEWIS, Managing Director of the Gas Purification and Chemical Company, Ltd., after a short illness. Mr. Lewis had been in the service of the Company since 1900 and held the office of Managing Director for the last six years. He was held in the highest esteem by his many friends in the Industry, and his great experience and ability will be sorely missed by those he had been privileged to serve.

The death took place on Oct. 24 of Mr. ARTHUR W. AKED, a Director of Rossendale Union Gas Company.

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Mr. HENRY ADDIS PRICE, late Chairman of the Davis Gas Stove Company, Ltd., passed peacefully away at Bognor on Oct. 27 in his eighty-sixth year. Mr. Addis Price had been connected with the Davis Gas Stove Company since its formation, and with his cousin, Mr. Henry Davis, father of the two present Managing Directors, founded the business.

Forthcoming Engagements

Oct.

30.—B.C.G.A.—Eastern District Conference at Grimsby.
30.—SOUTHERN ASSOCIATION.—General Committee Meeting at 1, Grosvenor Place, S.W. 1, 2.30 p.m.

Nov.

3.—I.G.E.—Council Meetings, 9.30 a.m. and 4.30 p.m., at the Institution of Mechanical Engineers.
3 and 4.—I.G.E. Autumn Research Meeting.
5.—S.B.G.I.—Autumn Meeting at the May Fair Hotel.
5.—BRITISH ROAD TAR ASSOCIATION.—Luncheon at Grosvenor House, Park Lane, W. 1.
5.—MIDLAND JUNIORS.—Meeting and Paper by D. W. G. Scott.
11.—MANCHESTER AND DISTRICT JUNIORS.—Visit to Bryan Donkin Company, Ltd. Paper by J. Albinson.
12.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at 1, Grosvenor Place, S.W. 1, 2.30 p.m.
13.—LONDON AND SOUTHERN JUNIORS.—Annual Dinner, Empire Restaurant, Victoria.
14.—SCOTTISH WESTERN JUNIORS.—Meeting and Paper by C. A. Poulson.
17.—I.G.E.—Gas Education Executive Committee at 2.30 p.m.
19.—MIDLAND ASSOCIATION.—Autumn General Meeting at Birmingham.
20.—LONDON AND SOUTHERN JUNIORS.—Meeting and Paper by W. L. Boon.
21.—WESTERN JUNIORS.—Visit to Norton Hill Colliery.
21.—MIDLAND JUNIORS.—Visit to Austin Motor Works.
21.—SCOTTISH EASTERN JUNIORS.—Visit to Inverkeithing.
24.—WALES AND MONMOUTHSHIRE JUNIORS.—Visit to Cardiff Engineering Exhibition.
26.—I.G.E.—Advisory Committee on Research at 2.30 p.m.
27.—I.G.E.—Liquor Effluents and Ammonia Committee at 11.15 a.m.; Joint Research Committee at 2.30 p.m.

There will be no meeting of the Central Executive Board of the National Gas Council, or of the Central Committee of the Federation of Gas Employers during the month of November.

News in Brief

For **Street Lighting** in the Woodside housing scheme gas was adopted on Oct. 19 by the Aberdeen Town Council.

To **Guide Aviators** the Accrington and District Gas Board have decided to paint their gasholders to indicate their geographical position.

Over 112 Tons of Copper was collected by the Barrow Corporation Gas Department from prepayment meters during their last financial year.

A **Reduction** of 1s. per 1,000 cu.ft. in the price of gas (at present 7s. per 1,000 cu.ft.) has been decided upon by the Old Meldrum Town Council.

Permission to Borrow has been granted to the Clitheroe Town Council. The amount involved is £730 for structural alterations to premises in Castle Street for the new gas showroom and £270 in respect of gas fittings, &c.

A Parcel of £1 Shares in the Minehead Gas-Light and Coke Company, Ltd., bearing an 8% dividend, were put up for sale by public auction on Oct. 19, when they realized the price of forty shillings per share. This is the highest price ever reached for the shares of this Company.

Appliance Sales during September by the Burnley Corporation Gas Department comprised 180 cookers, 16 fires, 94 boilers, and 170 water heaters, a total of 460, against 445 in the same period last year. The value of sales from April 1, 1936, was £18,114, against £16,484 last year.

At a Largely Attended Ratepayers' Meeting, held in the Corn Exchange, Dunbar, the Convener of the Gas Committee, Bailie A. P. Thomson, stated that there had been a growing consumption of gas in the Burgh, which, during the last year or two, had increased from 25 to 35 million cu.ft.

For Sale by Tender the Croydon Gas Company are offering £103,883 4% preference stock at a minimum price of £106 per £100, yielding at that price £3 15s. 5d.%. One month's dividend, calculated to Dec. 31, 1936, at 6s. 8d.% (less income-tax) will be payable to stockholders on March 1, 1937.

An Issue of Preference Capital is to be made by the Directors of the Barnet District Gas and Water Company, who are inviting tenders up to Monday, Nov. 9, for £25,000 of 4½% stock. The minimum price of issue is £120%, yielding at that price £3 15s.%. Particulars of this call for tenders will be found on our advertisement pages this week.

Over 1,000 People visited the Home Service Exhibition of the Burnley Corporation Gas Department in the Mechanics' Institute on the first two days. An outstanding feature of the exhibition is the transformation of the assembly hall stage into an ideal kitchen, with appliances and furniture to reduce the work of the housewife to a minimum.

An Interim Dividend out of the profits for the half-year ended Sept. 30, 1936, of 4% (actual) on the £5,600,000 capital stock has been declared by the Imperial Continental Gas Association, less income-tax at 4s. 9d. in the £, and payable on Nov. 14, 1936. The transfer books of the Association will be closed from Oct. 28 to Nov. 10, 1936, both days inclusive.

As a Means of Outside Lighting for shops the Penrith Urban Council is to "boost" gas. At a meeting of the Council the Gas Committee reported that they had received from the Engineer and Manager (Mr. G. Hudson) a report on a suggested system for supplying shopkeepers with suitable lamps for such lighting during the winter, with an estimate of the cost. The Gas Committee had approved the scheme in principle and authorized the Engineer to use his discretion in making arrangements for any installation.

A Supply of Oven Gas is to be taken by the Bishop Auckland and District Gas Company from the pipe line being constructed from Brancepeth Colliery, owned by Messrs. Straker and Love, Ltd., to the Darlington Corporation Gas-Works. It was previously intended to carry the supply direct to Darlington, but it is now stated that the line will be "tapped" at Bishop Auckland. The crude gas will be purified at the Company's Gas-Works at Fylands, and part of the plant used to carbonize coal will be closed.

The Industrial Co-Partnership Association at their Annual Meeting held recently re-elected Viscount Cecil of Chelwood and Mr. W. A. Appleton as Joint Presidents of the Association. Mr. F. W. Raffety, Chairman of the Association, said that an increasing tendency to introduce Co-partnership and Profit-sharing schemes had been noted, and a number of important new schemes were to be welcomed. The Annual Report recorded the continued support as personal members of the Association of a large number of employees in co-partnership firms, including over 2,000 of the workers of Messrs. Bryant & May, Ltd.

Some Significant Figures relating to the Arbroath Gas Department were cited by Bailie Law, Convener of the Gas Committee, when speaking at an election meeting last week. In 1928-29 the price for slot meter consumers was 3s. 6d. per 1,000 cu.ft., and for ordinary consumers 3s. 2d. per 1,000 cu.ft.; in 1936-37 it is 2s. 10d. and 2s. 6d. The increase in the price this year was due to the increase in the price of coal. The amount of gas made in 1928-29 was 193,827,000 cu.ft., and in 1935-36, 224,461,000 cu.ft., an increase of some 30,000,000 cu.ft. In 1928 the bonded debt on the Gas-Works was £25,016, to-day it was £1,893, a drop of practically £23,000.

Amalgamation and Grouping

Shanklin and Ventnor and Sandown.

The Shanklin and Ventnor Gas Company and the Sandown Gas and Coke Company are applying for a Special Order providing for the transfer of the Sandown undertaking to the Shanklin Company.

South-Eastern, Ascot, and Uxbridge.

The Directors of South-Eastern Gas Corporation announce that the recent offers to stockholders of the Ascot District Gas and Electricity Company and the Uxbridge, Maidenhead, Wycombe, and District Gas Company have been accepted by substantial majorities. The terms of these offers were given in our issue of last week.

South-Eastern Increase Capital.

At an Extraordinary General Meeting of South-Eastern Gas Corporation, held last week, Sir David Milne-Watson, LL.D., D.L., the Chairman, presiding, the resolution increasing the share capital of the Corporation to £4,000,000 by the creation of 1,500,000 new shares of £1 each, of which 750,000 shall be ordinary shares and 750,000 shall be irredeemable 4% preference shares, was passed unanimously.

The Chairman also announced that Mr. Thomas Hardie, M.Inst.C.E., a Director and late Chief Engineer of the Gas Light and Coke Company, has been appointed a Director of the Company.

South-West Utilities, Ltd., and Barnstaple.

In accordance with the terms of the offer recently made by South-West Utilities, Ltd. (whose registered offices are in Honiton), to the shareholders of the Barnstaple Gas Company (which was accepted to the extent of 94%) all the Directors have retired from the Board, and Messrs. B. R. Dunning and C. N. Tweed, Dr. J. A. Purves, and Mr. F. L. Schofield have been elected to fill vacancies. It is interesting to note that Mr. F. W. Hunt, J.P., C.A., had been a Director of the Company for 40 years, Dr. J. R. Harper, J.P., C.C., C.B.E., for 30 years, and Messrs. J. H. L. Brewer and A. J. Reavell for 18 years, and that Mr. Schofield has been Secretary and Manager for 37 years.

The retiring Directors have placed on record their recognition of the invaluable services rendered by Mr. Schofield to the Company over the above-mentioned long period, their sincere thanks for the able and whole-hearted manner in which he discharged his duties, and the consistently reliable advice he gave them at all times, both in respect of the Works and financial side of the Company, enabling them to pass on its control to their successors while in so sound and satisfactory a condition.

THE AUTUMN RESEARCH MEETING OF
The Institution of Gas Engineers

The following is the programme which has been arranged for the 8th Autumn Research Meeting of The Institution of Gas Engineers to be held on Tuesday and Wednesday, Nov. 3 and 4, at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, S.W. 1.

Tuesday, Nov. 3, 1936.

Opening of 8th Autumn Research Meeting.

10 a.m.

1. Secretary (J. R. W. Alexander) to read the NOTICE convening the Special General Meeting of The Institution of Gas Engineers at The Institution of Mechanical Engineers, Storey's Gate, St. James' Park, London, S.W. 1.
2. To receive and discuss the 13TH REPORT OF THE GAS EDUCATION COMMITTEE; 1935-36. (*Communication No.* 138.)
3. (*a*) To present DIPLOMAS IN GAS ENGINEERING (MANUFACTURE) for 1936 to:—

   Charles Richard Corrin (Onchan, I.O.M.), *2nd Class.*
   John Aspinal Derbyshire (Shipley), *2nd Class.*
   Arthur Facer (Bristol), *1st Class.*
   Ernest James Fillery (Newark), *2nd Class.*
   Stanley Jones (Blackpool), *2nd Class.*
   Harold Moys (London), *1st Class.*
   Albert Pickard (Knottingley), *1st Class.*
   Francis Goodall Symon (Coatbridge), *1st Class.*

   (*b*) To present a DIPLOMA IN GAS ENGINEERING (SUPPLY) for 1936 to:—
   Alexander Cochrane Rea (Perth), *1st Class.*

11 a.m.

4. To receive and discuss the 38TH REPORT OF THE JOINT RESEARCH COMMITTEE OF THE INSTITUTION AND LEEDS UNIVERSITY. Corrosion from Products of Combustion of Gas—Part IV. Tube Experiments (continued). (*Communication No.* 140.)

11.45 a.m. to 12.30 p.m.

5. To receive and discuss the 39TH REPORT OF THE JOINT RESEARCH COMMITTEE OF THE INSTITUTION AND LEEDS UNIVERSITY. The Investigation of the Use of Oxygen and High Pressure in Complete Gasification—Part I. Gasification with Oxygen. (*Communication No.* 141.)

3 p.m.

6. To receive and discuss the 6TH REPORT OF THE LIQUOR EFFLUENTS AND AMMONIA COMMITTEE. (*Communication No.* 142.)

3.30 p.m.

7. To receive and discuss the 27TH REPORT OF THE REFRACTORY MATERIALS JOINT COMMITTEE. (*Communication No.* 143.)

4 to 4.30 p.m.

8. To receive and discuss the INSTITUTION GAS RESEARCH FELLOWSHIP REPORT; 1935-36. The Scaling of Mild Steel in Sulphur-Free and Sulphur-Containing Furnace Atmospheres (continued), by H. C. Millett, Ph.D. (Research Fellow), and J. W. Cobb, C.B.E. (Livesey Professor). (*Communication No.* 145.)

Wednesday, Nov. 4, 1936.

10 a.m.

9. To receive and discuss the 3RD REPORT OF THE GASHOLDER COMMITTEE. (*Communication No.* 144.)

10.45 a.m.

10. To receive and discuss the REPORT ON THE REMOVAL OF SULPHUR COMPOUNDS FROM TOWN GAS DOWN TO 10 GRAINS PER 100 CU.FT. (*Communication No.* 146.)

11.30 a.m. to 12.30 p.m.

11. To receive and discuss a PAPER on THE FORMATION OF NITROGENOUS GUM DURING THE STORAGE AND DISTRIBUTION OF GAS, by H. Hollings, M.Sc., Chief Gas Chemist, The Gas Light and Coke Company. (*Communication No.* 147.)

2.30 p.m.

12. To receive and discuss a PAPER ON SMALL GAS GOVERNORS, by H. J. Hadow, B.A., and L. H. Pinkess, B.Sc., Watson House, The Gas Light and Coke Company. (*Communication No.* 148.)

3.10 p.m.

13. To receive and discuss a PAPER on AN INTEGRATING METHOD FOR THE MEASUREMENT OF THE TOTAL RADIATION EMITTED BY DOMESTIC HEATERS. by A. R. Bennett. M.Sc., and Harold Hartley, D.Sc., Central Research Laboratories of Radiation Limited. (*Communication No.* 149.)

3.30 p.m.

14. (*a*) To receive the 2ND REPORT OF THE RESEARCH EXECUTIVE COMMITTEE; 1935-36. (*Communication No.* 139.)

    (*b*) GENERAL DISCUSSION (i) the 2nd Report of the Research Executive Committee; 1935-36. (Communication No. 139) and (ii) Gas Research and Investigation.

    This Discussion is intended (*a*) for the consideration of matters referred to in the 2nd Report of the Research Executive Committee and not dealt with in the separately published Communications for which time for discussion has previously been provided during the Meeting, and (*b*) for the review and general discussion of, and the submission and consideration of proposals for, Gas Research and Investigation and Technical Work.

4.15 to 4.30 p.m.

15. To receive a Report of the BALLOT for the election of an Honorary Member and Members, Associate Members, and Associates.
16. To report that the 74TH ANNUAL GENERAL MEETING will be held in London on 1st, 2nd, 3rd, and 4th June, 1937.
17. To report that the 9TH AUTUMN RESEARCH MEETING will be held in London on 2nd and 3rd November, 1937.
18. VOTES OF THANKS.

Scottish (Western) Juniors

Visit to Messrs. Colvilles Steel and Iron Works

On Wednesday evening, Oct. 14, the Scottish Junior Gas Association (Western District) paid a visit to the Dalzell Steel Works of Messrs. Colvilles, Ltd., Motherwell.

Fully thirty members took advantage of the opportunity to be present. The party was received by Mr. Parker, of Colvilles, Ltd., and thereafter the party divided into groups and made a tour of the various Departments. Opportunities were given of observing the charging of the furnaces with raw material, the tapping of one or two of the furnaces, and the progress of the ingots through the various rolling mills. In the tapping process, quantities of molten steel, ranging up to almost 100 tons, were run off at a temperature approaching 1,750° C. A most interesting tensile test was carried out in the presence of the party, in which a sample of steel withstood a strain of about 30 tons per sq.in. At the close of the tour the Association Members were entertained at tea.

The President of the Association, Mr. JOHN WEBSTER, of Port Glasgow, then expressed thanks on behalf of the Members and himself for the courtesy extended to them in giving them the opportunity of inspecting the works of Messrs. Colvilles.

Mr. PARKER replied for Messrs. Colvilles, Ltd., and in his remarks mentioned that gas-works and steel works were in some measure connected with each other as his Company were at the present time producing steel for use in gas-works, especially for gasholder plates.

The Coke Oven Managers' Association

Annual Dinner

The 21st Annual Dinner of the Coke Oven Managers' Association was held at the Hotel Victoria, London, on Thursday, Oct. 22. Mr. Thomas Johnson—who had been elected President at the Annual Meeting held during the afternoon—was in the Chair and there was a representative company.

The Rt. Hon. Lord GREENWOOD, P.C., proposing "The Coke Oven Managers' Association," said he did so with the greatest pleasure for two specific reasons. The first was because of the importance of the Association; and as the Chairman of a steel company—and he thought a great steel company—he appreciated as much as anybody could the invaluable services rendered by coke oven managers and the personnel connected with coke ovens. The second reason was that it was a very great pleasure to him to accept the invitation to attend this dinner because Mr. Thomas Johnson, the Manager of his Company's new Cleveland coke ovens—and therefore a colleague of his, and he always liked to feel that those employed by Dorman Long & Co. were colleagues of the management—was President of the Association. It was also the 21st birthday of the Association and he congratulated them on a splendid record of improving usefulness. To-day the demands of science in connection with the production of coke—and he was referring only to coke and to coke oven managers—were such as to make the profession of the coke oven manager a select one, and he felt the Association was right in making it difficult for anyone to become a member and to make certain that every member had that practical and scientific attainment which justified his position in one of the indispensable callings of our great industries. They were now enjoying a reasonable wave of prosperity, but the dangers of prosperity were, if anything, greater than the dangers of depression in the great basic industries upon which the whole of our industrial fabric was built up. He looked upon coke oven managers with their scientific skill, their knowledge, and their capacity to train the personnel with whom they came in contact to get ready for that day when the demand would fall at home and they would have fierce competition from abroad from countries which paid low rates of wages and who worked much longer hours and who were able to produce vastly more than they could ever hope to do.

The PRESIDENT, responding to the Toast, said it afforded him the greatest possible pleasure to do so, especially on this occasion of the 21st anniversary of the formation of the Association. He thanked Lord Greenwood for the very kind references he had made about the work of the Association. Its members had arrived at the age of maturity as far as the Association itself was concerned, but many of the members were full-grown he-men and doing men's work when the Association was formed 21 years ago. What did the coke oven managers ask for? They asked that the coke oven manager should be allowed to do his job; that he be not placed, as he was in the early days, to work under some mine agent or other official who knew very little indeed about coke making; and they asked that the coke oven manager be made directly responsible to the general manager or chief official, as the case may be. Granted that, he would guarantee that the coke oven manager in the future would deliver the goods 100% quality and quantity and at the right price.

"Our Guests."

Mr. D. V. HOLLINGWORTH, proposing "Our Guests," coupled the toast with the names of Mr. Stephen Lacey (President of The Institution of Gas Engineers) and Mr. W. A. S. Calder (Immediate Past-President of the Society of Chemical Industry). After enumerating the principal guests he expressed the view that for the first time in history it could truthfully be said that the coking industry in this country was now carried on on a scientific basis and in as progressive and as successful a manner as in any country in the world.

Mr. STEPHEN LACEY, making the first response to the Toast, said that as his work was concerned with the distribution and utilization of gas in the London area he was not brought into very close touch with the coke oven industry. Nevertheless, it was a privilege to him to reply to the toast because The Institution of Gas Engineers, of which he happened to be President for the time being, was from the national point of view more fundamentally related to the Coke Oven Managers' Association than any of the other scientific and technical bodies which had joined in congratulating the Association upon its coming of age and wishing it very many happy returns of the day. Coal was the raw material of both the coke oven and the coal gas industries, and they could both fairly claim that they treated the raw material in the best possible way and converted it into superior forms of heat energy for use in industry and the home, not to mention the manifold by-products of the treatment of coal in this way. Moreover, so far as the chemical and engineering technique of their respective manufacturing processes was concerned, there was to-day little to choose between them. The difference between the two industries were, perhaps, commercial and not technical, and he would content himself with saying that the benefits to the community arising out of co-operation between the two industries were being more and more realized. In conclusion, Mr. Lacey congratulated the Coke Oven Managers' Association on the book it had produced entitled "The History of Coke Making and of the Coke Oven Managers' Association." This, he said, was a model of its kind and led him to think that had the Association been in existence 30 years ago, the position of the coke oven industry would probably have been very much improved over even what it was to-day.

Mr. W. A. S. CALDER also briefly replied and after referring to his association with coke oven managers in the production of materials for national defence during the Great War, said he regarded them as chemical engineers and a class which, in an emergency, was prepared to play its part. He regarded them, he said, as the Iron Division in the Chemical Engineering Corps.

"Gas Helps Our Neighbours These 'Modern Times' to More Home Comfort"

A Parkinson Window Display

With the above slogan the Parkinson Stove Company feature a special display of the latest automatic ignition gas fires in their London Showrooms at Terminal House, Grosvenor Gardens, S.W. 1.

This display has been ingeniously designed to link-up with the *Daily Express* "Help Your Neighbour" competition, and incorporates a clever tie-up with the film "Modern Times" showing at the Viograph Cinema. To give added publicity to modern gas appliances, a number of slides, also designed to link up with the film, are being projected on the screen at the cinema.

PARKINSON STOVE Co LTD
P RKINSON PRODUCTIONS OF TO-DAY FOR THE HOMES OF TOMOR OW
Gas h is our neighbours
to more home comfort

This display policy of the Parkinson Stove Company is to be extended to the Gas Industry as a whole during the next few months. It will be remembered last year Parkinsons promoted a national display link-up with Miss Gracie Fields' film, "Love, Life, and Laughter," and by kind permission of the United Artists' Film Corporation they are again launching another campaign throughout the country in conjunction with "Modern Times," featuring the "Regal" cooker.

The series of displays which have been designed by the Parkinson Display Studio under the direction of Mr. Backhouse, Display Manager, are to be supplied to all gas undertakings in the areas where the film is being shown. Advance notification of the areas in which this film is appearing will be given to each Gas Undertaking from time to time. Screen and local Press facilities are also available.

Gas Journal Shewring Fund

Donations are invited to the Fund, full particulars of which were given in the "JOURNAL" for July 22. The Management of the Fund is in the hands of Messrs. F. G. Shaw (Buxton), W. W. Townsend (Colchester), and J. Bridge (Elland). All expenses having been guaranteed, the whole of the sums received will be applied, without any deduction whatsoever, to the benefit of the widow and children of Harold Shewring, by whose tragic death earlier this year they were left in distressed circumstances.

Cheques should be made payable to the "GAS JOURNAL," and crossed "Shewring Fund Account." All donations will be gratefully acknowledged by the Editor, who is Treasurer to the Fund.

A Prize-Winning Carnival Display

Our photograph shows the decorated lorry which was entered by the Dundee Corporation Gas Department in the Broughty Ferry Carnival and was successful in gaining first prize.

Simple Solution to Difficult Problem

Unusual Job in Welding Gas Mains

At Hendon, on the Edgware Road, oxy-acetylene welding provided a simple solution to a difficult problem. In order to make connections between the ends of an existing 12-in. cast-iron gas main some special bends in steel pipe had to be made. The gas main was cut for diversion and the bends were put in to circumvent an existing 6-in. water main and two telephone ducts, all of which interfered with a straight run. These obstructions necessitated a linking pipe of unusual shape which obviously could not be obtained in cast iron unless specially made.

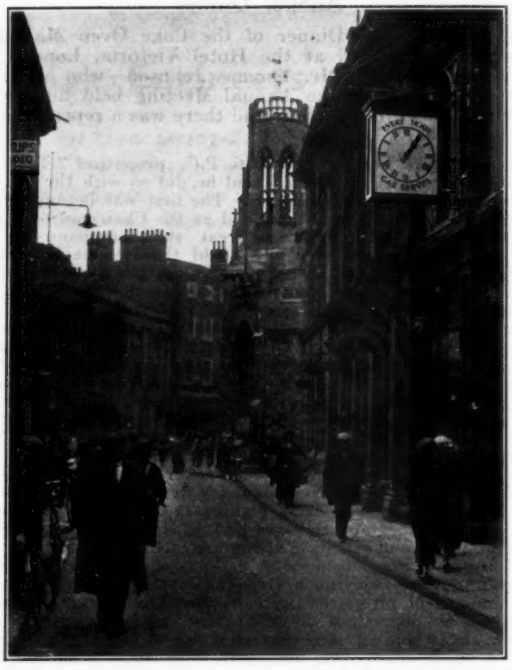
Fabricated Bend Welded in Position.

By making chalk drawings on the pavement alongside the trench the welder found a ready-to-hand means of laying out the bends. Segments were cut out of the steel pipe by the oxy-acetylene cutter (leaving about $\frac{1}{8}$ in. of the circumference uncut), and the ends were bent inwards over the chalk drawing till the gaps were nearly closed. The cut faces were then welded. Next, the completed fabricated pipe was fitted into position and the usual joints between cast iron and steel were made by running in molten lead.

In addition to the work involved in making and fitting in the special bend, welds were also made in 8-in. as well as in 12-in. gas mains. The thickness of the pipe wall in each case was $\frac{1}{4}$ in.

Messrs. John Cochrane, 39, Victoria Street, S.W. 1, were the contractors for the work.

A New Clock for York



We are indebted to the *Yorkshire Herald* for permission to reproduce this photograph of York's latest public clock which Mr. H. E. Bloor has had erected at the Offices of the York Gas Company in Davygate. The clock is gas floodlighted at night.

The Institution of Gas Engineers

Membership Transferences

The Secretary of The Institution of Gas Engineers announces that the following membership transferences have been effected in accordance with the Royal Charter and By-Laws:

Transferred from Associate Membership to Membership.

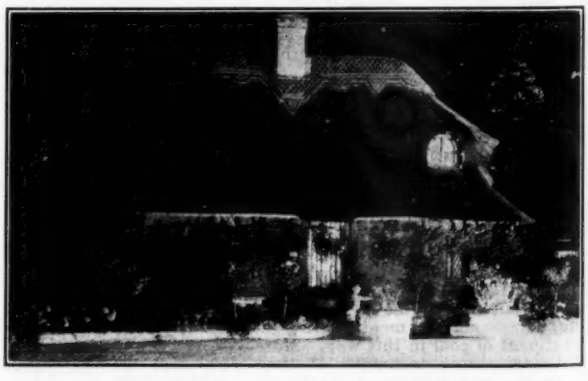
CHAPMAN, LESLIE BENJAMIN, B.Sc., Engineer and Manager, Skipton Gas Department.

MORTON, ROBERT, Engineer and Manager, Dorchester Gas and Coke Company.

Transferred from Associateship to Associate Membership.

CHAMBERS, ERIC PERCY THOMAS, B.Sc., Assistant Carbonizing Superintendent, Wandsworth and District Gas Company.

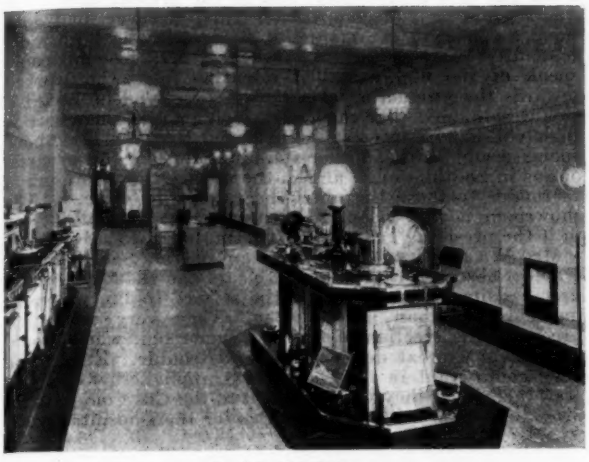
Floodlighting at Lowestoft



In competition with electricity, the Lowestoft Water and Gas Company carried out some excellent floodlighting at the Bellevue Park for the Lowestoft Corporation. The park is adjacent to the main road, and the lighting was favourably commented upon. We understand that many ladies were in the habit of sitting in the park at night, knitting by the floodlight.

Tunbridge Wells Company Open New Showrooms at Southborough

Another milestone in the history of the Tunbridge Wells Gas Company was marked on Tuesday of last week, when very attractive new showrooms were opened in the growing district of Southborough by the Chairman of the Local Urban District Council.



An Interior View.

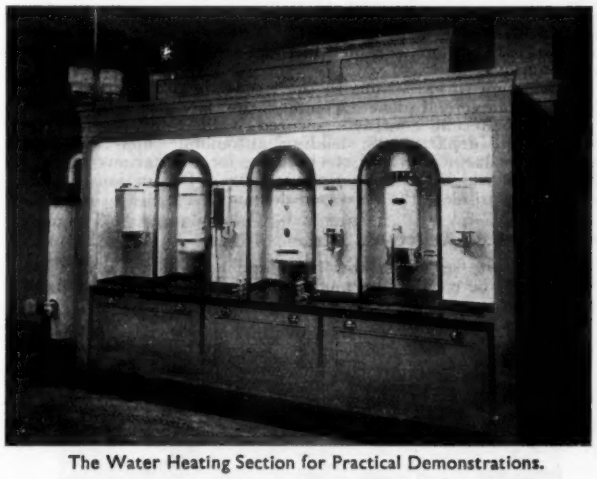
As far back as 1843 the Tunbridge Wells Gas Company was formed, and during the first year of its existence the sales of gas reached 3 million cu.ft.; in 1935 the output had risen to 525 million cu.ft.—figures which bear eloquent testimony to the expansion of the Undertaking's business.

Until last week, however, residents in the Southborough district had to journey some two miles or so to the nearest gas showrooms—*i.e.*, the chief office in Tunbridge Wells. Consequent upon the fact that more people are now using gas in Southborough than ever before and in view of the rapid development of a building estate in the area, the Directors of the Company decided that adequate service to this section of their consumers demanded the provision of showroom facilities in the district. Accordingly, last week witnessed the formal opening by Mr. W. H. Fleming, J.P. (Chairman of the Urban District Council), of handsome and thoroughly up-to-date premises in the main shopping centre, where consumers will be enabled to inspect all the latest domestic appliances in operation without the necessity of going into Tunbridge Wells.

The new showrooms are extremely attractive, having been designed on modern lines, with a pleasing interior decoration scheme of green, chromium, and black. Exterior gas lamps in chromium-plated finish illuminate the facia at night, and windows of the "open" type give a clear view of the displays within. The comparatively narrow frontage belies the spacious interior which goes back a considerable distance, the various appliances being tastefully arranged on either side. On one side are examples of modern coke grates, ignited by gas burners, together with various types of the latest designs of gas fire, both built in and independent, all in appropriate settings and different colour finishes. On this side also is the water heating alcove, containing various types of heaters—storage, instantaneous sink heaters, and multi-point models—all in operation and discharging into stainless steel troughs. On the opposite side is a comprehensive range of gas cookers in pleasing enamel finishes, together with gas washing machines and drying cabinets and a display of domestic refrigerators.

A prominent feature of the showroom is the gadget table, on and around which are set out a wide variety of smaller appliances which can be plugged in to gas, including pokers, sealing-wax jets, curling iron heaters, waffle irons, bowl heaters, &c.

At the far end of the premises is a demonstration platform, completely equipped and with a large direct reading meter dial, from which cookery and other lectures will be conducted from time to time. The interior lighting of the showroom is particularly effective, comprising attractive wall brackets, standard lamps, and a wide range of beautiful pendants all switch controlled from central points.



The Water Heating Section for Practical Demonstrations.

The Chairman of the U.D.C. unlocks the Door of the New Premises.

Entertained by the Company.

After the Chairman of the Southborough Urban District Council had unlocked the door of the new showrooms and formally declared them open to the public, a number of councillors and prominent local residents and their wives were entertained at tea by the Tunbridge Wells Gas Company—Mr. Henry Woodall, M.Inst.C.E. (Director), presiding in the unavoidable absence of the Chairman, Sir David Milne-Watson. He was supported by Mr. Leonard J. Langford (Engineer and General Manager) and other officials of the Company.

Mr. WOODALL, having apologized for the absence of the Chairman, who, he said, took a great interest in the Tunbridge Wells Gas Company, thanked Mr. Fleming and all those present on that occasion for their support and interest in the new showroom, which he was sure reflected great credit upon the architects and others concerned with its construction. He referred to his own and his father's long association with Southborough, a district which, though it had grown almost beyond recognition, still remained a delightful one, for which they owed their thanks to the local Council. He expressed the hope that the new showroom would provide further proof—if such were necessary—that the Gas Company were anxious to give the very best possible service to their consumers. In it they would see the best and most modern apparatus,

while there was also a platform from which lectures would be given by experts on the best methods of using gas for lighting, heating, and cooking.

The Directors had felt for some time, said Mr. Woodall, that the Southborough district, in which the Company were obtaining their largest increase in sales at the present time, should have a showroom of its own. Previously consumers had to travel over two miles to the nearest showroom, whereas they would now have these facilities in their own district, where they could get expert attention and advice at any time.

Some people, went on Mr. Woodall, were inclined to regard gas as a back number. This, however, was very far from the truth. The Gas Industry was flourishing, and appliance manufacturers were very busy. The Gas Light and Coke Company had a large interest in the Tunbridge Wells undertaking, and as some indication of the prosperous condition of the Industry he stated that this Company had so far this year recorded an increase of 5% in gas sales. This figure in itself might not convey very much to them, but, in fact, it indicated that the increased output in the Gas Light and Coke Company's area was equal to five years' consumption of gas in a prosperous town such as Maidstone. And increases of that nature were not uncommon throughout the country; indeed, in some districts they were even greater—so the Gas Industry was not despondent at its progress. Such results would not be possible were it not for the reliable product they sold and the capable engineers who were responsible for its production. The day was long past when gas held a monopoly, and at the present time there was a great deal of competition; this, however, had done them a considerable amount of good. Having been more than fifty years in the Gas Industry, Mr. Woodall could speak of the highly skilled scientific men who worked towards the production of a pure article, and he hoped it would be agreed that they were trying to do their best in their consumers' interests. He hoped that the new showrooms would mark another stepping stone in the progress of gas in Southborough and in the service they were proud to render to those they had the honour to serve. "The showroom is now open," concluded Mr. Woodall, "and in it the presiding genius, Mr. Therm, burns to serve you."

Mr. W. H. Fleming (Chairman of the Southborough U.D.C.) observed that it was 65 years ago that the district first had its gas supply, and the service to-day was very much better than it was then. They very much appreciated the erection of the new showroom, which would save them a great deal of time and trouble. Everything they could want in the way of gas appliances was to be seen there, and they were grateful to the Gas Company for providing these facilities as well as for their hospitality.

Trade Notes

The Incandescent Heat Company, Ltd.

To cope with the large number of orders in hand, both for home and foreign works, the Incandescent Heat Company, Ltd., Cornwall Road, Smethwick, Birmingham, builders of furnaces for all classes of heat treatment, have during the past few months carried out considerable extensions to their already well-equipped works.

In addition to extensions to the works themselves, the drawing and commercial office accommodation has also been greatly increased. Recent contracts secured include installations for Government departments, leading automobile manufacturers, and several large iron and steel works, for the various types of furnaces in which the Company specialize. Production is being speeded up to meet the increased demand.

Hailwood & Ackroyd, Ltd.

The lighting season is now here, and no doubt many of our readers will be considering modernizing or renewing their lighting fittings.

In this connection, Messrs. Hailwood & Ackroyd, Ltd., Morley, nr. Leeds, draw our attention to the fact that they have a large and well-stocked showroom at 71-75, New Oxford Street, W.C. 1, where they have on view almost every type of lighting fitting, bowl, shade, and globe, in numerous colours and decorations.

Our photograph shows one corner of the ground floor of their showroom.

A Gas-Heated Service Counter.

An interesting gas-heated cafeteria service counter, executed by James Farquharson & Sons, of Houndsditch, E.C. 3, is to be installed in the staff canteen of a Glasgow firm of bakers.

This counter incorporates two 5 ft. gas-heated self-generating steam type hot closets, in vitreous enamelled finish, with bain maries above containing stainless steel vegetable and entrée receptacles. The counter top consists of a continuous run of "Staybrite" steel, while the front is built up of polished black Marmorite panels, having a deep lustre and framed in stainless steel. The underside of that part of the counter not occupied by the hot closets is fitted with shelves for the storage of cold dishes, crockery, &c.

Mounted on the counter is a gas-heated café set comprising a 10-in. chromium-plated "Bell" automatic water boiler, with milk and coffee urns attached.

A counter of this type is capable of providing two hundred persons with a simple daily menu and ensures the rapid service of really hot meals. It can be constructed to any shape and to cater for any numbers.

Powers-Samas Open New Offices.

In the extremely up-to-date and well-decorated building at Holborn Bars, E.C. 1, into which Powers-Samas Accounting Machines, Ltd., have moved on the approach of their 21st birthday, a large gathering was present on Tuesday, Oct. 20, to witness the opening by Sir Josiah Stamp, G.C.B., G.B.E., of an Exhibition of new models.

The most noteworthy exhibit was the Powers-One, a new addition to the range which brings this highly developed form of mechanical accounting machine within the reach of smaller concerns than heretofore. Basic data is recorded, by means of either a hand manipulated or automatic key punch, as a series of holes punched in cards measuring, in the case of the Powers-One, only 2¾ in. by 2 in., and affording 21 columns of information; the position of the hole determining the information it is desired to record. These cards are verified by means of another simply operated machine which automatically detects and jams upon any error in punching, and they thus become permanent records in itemized form convenient for rapid mechanical handling. Their classification can next be accomplished by a sorting machine which arranges them in any required classification, automatically stopping when a receiving box is full or the supply of cards in the magazine exhausted. The information on the cards is then abstracted by a printing tabulator which presents it in statement form at a speed of 7,500 items an hour. Words as well as figures are printed, the tabulator adding or subtracting and producing sub and grand totals and balances whenever required.

The same principle has already been developed in the Powers-Four and Powers-Samas equipment, which has been installed in many of the larger gas undertakings as well as by Government departments and important concerns in all parts of the world.

In a short speech introducing Sir Josiah Stamp, Sir Joseph Burn mentioned his "painful remembrances" of the enormous amount of work entailed in accounting in earlier days, when big results were wanted but not always attained, and laid emphasis on the need for machinery in the office. Sir Josiah, speaking of his own enthusiasm for tackling the problems of modern life, said that as long as a hundred years ago Charles Babbidge explored the possibilities of mechanical analysis, but he would have been surprised at developments to-day. The old fashion of keeping accounts was deadening in its monotony—the most favoured method being to add up a column of figures, add it down again, and finally take a mean between the two answers so obtained! But the use of machinery, besides its obvious advantages of results produced more swiftly than ever before, was stimulating to the alert brain, and although the man who had installed a refrigerator in his home still hesitated to install machinery in his office, he was sure that the women who operated Powers machines would make super-wives—especially when dealing with the gas cooker. These machines, said Sir Joseph, were entirely British, and the factory at Croydon (which is now being extended) employs 1,700 people.

Manchester District Association of Gas Engineers

An Ordinary General Meeting of the Manchester District Association of Gas Engineers was held at the Midland Hotel, Manchester, on Friday, Oct. 23—Mr. A. L. HOLTON (Manchester) presiding.

The Meeting was preceded by a luncheon at which Mr. Charles Wood, O.B.E., F.C.S. (Bradford), who has been a member of the Association for fifty years, was the guest of honour and received the felicitations and congratulations of the Association.

The PRESIDENT said that a perusual of the membership list of the Association would show that there were nine members who joined the Association prior to 1900. One of the number, Mr. Charles Wood, became a member exactly fifty years ago. To have the distinction of being a member of a technical association for half a century did not occur to many, and he was convinced that all present would be in accord with the unanimous decision of the Committee that such a record should not be allowed to pass without reference being made to such a distinguished anniversary. Mr. Charles Wood had, therefore, been invited to attend the luncheon as the guest of honour, and he had the privilege of submitting a toast to his health and future happiness.

From early days, said the President, Mr. Wood had been an experimentalist in the spheres of chemistry, physics, and economics. Mr. Wood commenced his professional career as assistant to his father, who was at that time Chief of the Bradford Gas Department. Eventually the son succeeded to the position. While efficiently serving the Bradford Gas Undertaking he had contrived to find time to devote himself to the wider interests of the profession. He was elected President of The Institution of Gas Engineers in 1906 and of the Manchester District Association of Gas Engineers in 1901, and was now one of two Honorary Members. He had also represented the West Riding of Yorkshire on most of the National Councils connected with the Gas Industry.

Particularly strenuous were his activities during the war and post-war periods; and, unfortunately, the severe strain affected his general health. He was sure they would all be delighted to learn that now he never felt better in his life.

The work carried out by Mr. Wood at Bradford and the record of his wider service were permanent evidence of his eminence as a Gas Engineer. One noteworthy feature was that the pre-war price of gas at Bradford was 2s. 1d. per 1,000 cu.ft., with discount. In the early days Mr. Wood recognized the necessity for special terms to large consumers. He was also very early in the field in regard to the introduction of continuous vertical practice and benzole extraction.

A Telegram from the Institution.

Since it became known that Mr. Wood was to be their guest that day he, the President, had received quite a number of communications. There was one from Mr. Wilkinson, who, he believed, was the Honorary Secretary of the Manchester District Association of Gas Engineers when Mr. Wood occupied the Presidential Chair. That gentleman expressed his delight that they were honouring Mr. Wood upon that occasion. Mr. Hardie, of London, had written to him, and in the course of his remarks had asked him to convey to Mr. Wood his best wishes for his good health and continued happiness. Telegrams had also been received from the President and Secretary of The Institution of Gas Engineers as follows:

> Please convey my greetings and good wishes as President of The Institution of Gas Engineers to Mr. Charles Wood, Past-President, on the occasion of your honouring his fifty years' membership of the Institution and of the Manchester District Association of Gas Engineers. I trust you have a successful meeting to-day.
>
> STEPHEN LACEY.

> Please accept my sincere good wishes for your meeting to-day and express my salutations to Past-President Charles Wood, at whose centenary I shall be present.
>
> ALEXANDER.

Mr. R. G. SHADBOLT (Birmingham) said he was very much gratified to be able to add a few words of felicitation and congratulation in regard to his old friend, Mr. Charles Wood, on this particularly auspicious occasion. Too much retrospection was a bad thing, particularly in a progressive organization such as the Association, and particularly before such an audience. Nevertheless, he hoped that they would bear with him for a few moments while he took a peep back into the past. Mr. Wood always had been, and was to-day, an exceedingly peaceable, quiet, and modest individual. It was entirely owing to that fact, though Mr. Wood was Senior member to himself, that he found himself Mr. Wood's Senior with regard to the Past-Presidency of the Association. But Mr. Wood had learned a lesson. He set to work, and he achieved the Presidency of the National Organization a year or two sooner than himself. It was well within his recollection that the late Arthur Graham, of Mansfield, and himself, after many ineffectual efforts on the part of the Committee of the Manchester District Association of that day, were permitted to see Mr. Wood personally and use their persuasive powers with a view to putting him forward as Vice-President, and finally as President of the Association. His hearers would probably be astounded at the number of arguments that were used in trying to effect that purpose. Eventually, after quiet and long meditation, Mr. Wood took the step, and it was probably one which he had never regretted to that very day. For one reason, he was one of those individuals who, owing to their very nature, require bringing out of themselves, otherwise one never knew the best that was in them. The Association had benefited, the gas administrators of the country had benefited, and the technique of the Industry had benefited possibly more than they knew by the quiet, persistent, and faithful manner in which Mr. Wood had carried out his duties.

The Toast was then duly honoured.

Mr. CHARLES WOOD, O.B.E., F.C.S., in responding to the Toast, hoped that he had done something to deserve at any rate part of the kind things which had been said about him. His election as a member of the Association took place in a room or hall in Cooper Street, Manchester, 50 years ago last February. Of course, his nomination had been accepted by the Committee previously. Some little objection was taken to him on the ground that he was too young, being only 22 at the time. He noticed that the present-day rules stated the age for entrance must be not less than 24. However, he had been two years in charge of one of the Bradford works, and in due course he was elected a member of the Association.

He was pleased to be able to state that he felt better in health at the present time than he had been for a long time past.

He noticed that there were some remarks in that week's issue of the "GAS JOURNAL" concerning the merits of municipal and company-owned gas-works. All his own experience had been with a municipally-owned gas undertaking. He had had good Chairmen and he had had bad ones, but he had been happy most of the time. He had had the experience of serving under a Chairman who boasted on more than one occasion that he had never been inside a gas-works and never would go in one. In conclusion, he expressed the hope that he would be able to attend the Jubilee anniversary of other members of the Association who at present looked much younger than himself.

The President.

Councillor W. P. JACKSON (Chairman of the Manchester Gas Committee and President of the B.C.G.A.) proposed the toast of "The President."

The PRESIDENT duly responded.

BUSINESS MEETING.

The General Meeting of the Association was held at 2.30 p.m.—the PRESIDENT, Mr. A. L. Holton, in the Chair.

The Minutes of the previous Ordinary General Meeting were approved and signed by the President as a correct record.

Scrutineers.

Messrs. H. Pickles (Morley) and S. Carter (Liverpool) were appointed Scrutineers of the Ballot Papers in regard to the election of Officers of the Association.

As the result of the Ballot the following were elected:

President.—Mr. R. N. Webb (Leeds).

Vice-Presidents.—Mr. E. Astbury (Liverpool) and Mr. H. Singleton (Huddersfield).

Hon. Secretary and Treasurer.—Mr. H. Burton (Shipley).

New Members of Committee.—Mr. J. Bridge (Elland), Mr. E. Crowther (Salford), and Mr. C. S. Shapley (Leeds).

Auditors.—Mr. R. B. Braddock (Radcliffe) and Mr. Francis Elliott (Leyland).

The members rose in silence as a tribute to the memory of Mr. Dugald Currie (South Shields, Member 1917) and Mr. Harold Shewring (Cambridge, Member 1925).

The Hon. Secretary (Mr. J. Bridge, Elland) announced that apologies for absence had been received from the Presidents and Secretaries of The Institution of Gas Engineers and kindred Associations.

New Members.

The President extended a welcome to the following new members of the Association, and expressed the hope that their connection with it as a technical body would prove of great professional assistance to them in the future.

Mr. W. H. T. Johns (Engineer and Manager, Gas-Works, Rotherham).

Mr. J. W. Roberts (Manager, Gas-Works, Ripon).

Mr. Thomas Dyson (Assistant Engineer, Gas-Works, Huddersfield).

Mr. B. Thorpe (Assistant Superintendent, Grimesthorpe Gas-Works, Sheffield).

Mr. W. B. Harrison (Engineer and Manager, Gas-Works, Sowerby Bridge).

Mr. Leslie S. Pickles (Engineer and Manager, Gas-Works, Hebden Bridge).

Mr. L. B. Chapman, B.Sc. (Engineer and Manager, Gas-Works, Skipton).

Mr. James Fletcher (Chief Engineering Assistant and Works Superintendent, Gas-Works, Wallasey).

Mr. F. N. Booth (Engineer and Manager, Gas-Works, Keighley).

Presentation of Examination Certificates.

The President said it was very gratifying to him personally to have the pleasure of presenting 30 certificates to successful candidates in the 1936 examination of The Institution of Gas Engineers. The successes obtained by the candidates were an earnest not only of the continued prosperity of the profession they were now adopting, but also of the Junior and kindred Associations. He urged the members to grant every facility to Juniors to attend their respective meetings. The benefits Juniors derived from visiting other works, and by the interchange of ideas on works processes, were of value not only to themselves, but also to the undertakings they served. In making this appeal he was not unmindful of the encouragement and the assistance that many Senior Engineers gave to their staffs. What he would like to see was an extension of those privileges throughout the whole of the Industry, and especially he would like to see the travelling expenses of Juniors paid by their respective undertakings. Such privileges, he could assure them all, were very highly appreciated. If the Juniors were helped to help themselves, and thus become fully-trained assistants, the Industry as a whole was bound to benefit in greatly increased ratio.

The following is a list of the successful candidates.

GAS ENGINEERING—HIGHER GRADE.

EXTERNAL CANDIDATES.

H. E. S. Birks	Goole	1st Class
A. G. Hartley	Blackpool	,,
A. S. Horner	Wallasey	,,
K. W. B. Sharpe	Huddersfield	2nd Class
W. R. Taylor	Rotherham	,,
J. Topping	Preston	,,

INTERNAL CANDIDATES.

R. Bairstow	Chester	1st Class
E. Bates	Stalybridge	,,
S. E. Balsom	Wrexham	,,
G. R. T. Cook	Leeds	,,
N. Matthews	Bolton	,,
A. Ormrod	Oldham	,,
S. H. Stokes	Buxton	,,
F. Bootham	Burnley	2nd Class
W. R. Geddes	Stretford	,,
D. Lewis	Stockport	,,
R. S. Longhurst	Reading	,,
N. Mear	Huddersfield	,,
W. A. Pask	Oldham	,,
W. Preston	Skipton	,,
A. K. Renshaw	Hale	,,
R. O. Roberts	Rhyl	,,
J. W. Stacey	Sheffield	,,
J. Wilson	Keighley	,,

GAS SUPPLY—HIGHER GRADE.

EXTERNAL CANDIDATES.

C. W. Hemingway	Featherstone	1st Class
J. A. Speers	Preston	,,
E. B. Field	Blackburn	2nd Class

INTERNAL CANDIDATES

J. Denham	Elland	1st Class
A. Blenkiron	Bradford	2nd Class
R. C. Haslock	Bingley	,,

DIPLOMA IN GAS ENGINEERING (MANUFACTURE).

To be presented at the Autumn Conference of The Institution of Gas Engineers:

A. Pickard	Knottingley	1st Class
J. A. Derbyshire	Shipley	2nd Class
S. Jones	Blackpool	,,

In particular, the President congratulated Mr. J. Denham, Elland, upon having obtained the First Prize and Silver Medal of the City and Guilds for the Minor Course in Gas Supply, and, in addition, the First Prize of five guineas of the Society of British Gas Industries.

Short Papers.

The following Papers were presented:

Mr. E. A. Davies (Manchester). "The Supervision of a M.A.N. Waterless Gas Holder."

Mr. J. E. Holliday (Otley). "The Staffing and Organization of a 100 Million Works."

Mr. T. Reynolds (Stockport). "Distribution and Sales Re-organization."

That of Mr. Reynolds is published this week, and the others will be dealt with subsequently.

The Shewring Fund.

The PRESIDENT made an earnest appeal to the members for a lead to be given to the Committee with a view to contributing a subscription from the Association to the Shewring Fund, promoted by the "GAS JOURNAL."

Upon the Motion of Mr. F. G. SHAW (Buxton), seconded by Mr. T. REYNOLDS (Stockport), and supported by Mr. C. H. BAMBER (Rochdale), it was resolved unanimously that a subscription be forwarded to the "GAS JOURNAL" Shewring Fund from the Association.

Mr. R. N. WEBB (Leeds) cordially thanked the members of the Association for electing him President for the forthcoming year, an office which he would endeavour to fill with the maximum of usefulness to all concerned.

Mr. H. BURTON (Shipley) also desired to thank the members for the honour they had conferred upon him in electing him Hon. Secretary in place of Mr. J. Bridge (Elland), whose health, he was exceedingly sorry to say, compelled him to resign his secretarial duties.

Vote of Thanks.

Upon the motion of the PRESIDENT a hearty vote of thanks was unanimously accorded to the readers of the Papers for their interesting communications.

Mr. T. REYNOLDS briefly responded to the vote of thanks, and the proceedings concluded.

Distribution and Sales Re-Organization at Stockport

by
T. REYNOLDS
(Engineer and Manager of the Southport Gas Department).

A Paper read before the Manchester District Association of Gas Engineers at their meeting held in the Midland Hotel, Manchester, on Friday, Oct. 23.

Prior to 1930, the sales side of the Gas Department in Stockport was undeveloped owing to lack of staff and showroom facilities. The greater part of the business was transacted through the post, and casually by members of the Distribution Department. After the erection and opening of the new showrooms in St. Petersgate in December, 1930, it was realized that an up-to-date Sales Section was an absolute necessity if we were to hold our own with electrical competition.

It was also realized that before this could be brought into operation the distribution system would require critical consideration, and a policy formulated which would enable us to meet any load which would be required.

Like the majority of old towns, Stockport had—in the past—developed its distribution system for its immediate needs, and you will appreciate the fact that the mains laid were just sufficient to do the job as far as size was concerned, the result being that when the building boom commenced, difficulties arose in all areas in giving an adequate supply. This, therefore, was the first problem which had to be solved.

A careful survey of the whole area was undertaken, and it was early realized that to augment the supply by low-pressure mains was out of the question, both on account of cost and the extreme difficulty in finding room in numerous streets for mains of large enough diameter. The only alternative was a high-pressure feeder system.

As far back as 1904 we had supplied the township of Bramhall by means of high-pressure gas through 2 miles of 4 in. and 2½ miles of 3 in. steel main with lead joints. In 1926 the demand upon this main had so increased that gas was transmitted at 30 lb. per sq.in. in an endeavour to cope with the consumption. We were obliged to replace this main with an 8 in. steel main (welded joints). This was completed in 1927 and the advantage was felt immediately. It had been costing the Department roughly £100 per month to keep the caulked joints tight on the old main owing to the high-pressure which had to be maintained.

In 1930 Heaton Lane Distribution Depôt was closed down and the land sold. This necessitated the laying of a new main from Portwood Works to the outlet mains at Heaton Lane, a distance of one mile. The peak load required was about 100,000 cu.ft. per hour, but we had to take into consideration expansion due to building operations and improving trade conditions. Here, again, the difficulty arose as to how to get a large enough low-pressure main to the point required. It was necessary to cross the River Mersey at one of its bridges which were already packed with subsurface works and of shallow construction. Again we had recourse to a steel high-pressure main. A 10 in. steel main was therefore put down, gas being supplied at 8 lb. per sq.in., and then broken down to town's pressure by Reynolds' Governors in duplicate. The laying of these two mains provided us with the necessary groundwork for ringing the area of supply with further high-pressure mains. Some of these are completed, others in course of construction, and the whole system will be in operation during 1937.

A Straight Chart in All Districts.

The proposed scheme is shown on the plan. These high-pressure supplies serve three purposes—firstly, they increase the supply in the area in which they terminate; secondly, they feed back into the town, thus enabling us to avoid excessive variation of pressure; and thirdly, they provide for further increase in consumptions as they materialize.

At present the outlet pressures on the governors vary slightly with each district owing to local conditions, but it is my intention to synchronize these immediately the scheme is complete. This will enable me to obtain a practically straight line chart in all districts.

Three sets of compressors have been installed, two having a capacity of 120,000 cu.ft. and one 200,000 cu.ft. per hour at 10 lb. per sq.in. The supply to these is taken from the holder outlet and through a 14 in. anti-fluctuator. They are automatically controlled by the outlet pressure, which may be varied to suit requirements.

The compressed gas passes to the usual receiver, and from this 10 in., 8 in., and 6 in. mains are taken.

A pressure of 8 lb. per sq.in. has proved very satisfactory. This gives a mains reserve pressure about 5 lb. at times of peak load. The greatest pressure drop at any time during the 19 working hours is not more than 3 lb. per sq.in.

It might be considered unwise to place so much dependence upon high-pressure distribution, but I am certain that there is little chance of serious breakdown. To ensure that we should be in a safe position should a breakdown occur on any system of governors, I have had a number of intermediate mains laid which link up the outer areas, and these would take up the load from the next district in the event of a fault arising. When laying intermediate mains we have taken advantage of new roads being constructed and laying mains along them. This policy has kept down the cost of reinstatement, which, as you are aware, sometimes amounts to over 50% of the actual costs of mainlaying along established roads.

As previously mentioned, in former days mains were laid for more or less local use; to-day all mains are considered from the point of view of the whole area of supply. To this end we keep in close touch with the Town Planning Department for the outer areas, so that, as far as possible, where new roads are being constructed, we have our own plans cut and dried well in advance, and can proceed without delay.

Immediately upon receiving instructions to proceed with any mains, blue prints containing these instructions are obtained from the drawing office and are sent to the other Corporation Departments interested. When the work is completed, a print is returned to the drawing office containing full details of the job.

I have put into operation a system of recording particulars of existing mains. Accurate information regarding these is placed upon the ordnance sheets.

Attached to every job card is a slip requesting the following information, which the man in charge of the service cart must supply each time he exposes a main:

Name of street.
Size of main.
Depth of main.
Distance from curb—right or left side from:
Nature of ground (surface and subsoil).
Date exposed.

This information is invaluable, as it enables us to keep reinstatement charges down to a minimum. It is also a record that we have examined these mains, should any enquiry arise due to a fracture or other cause at any time. The slips in question are entered into an official book kept for the purpose. Within a few years I hope to have a complete record of our underground works.

Emergency Motor Van.

One of the most important considerations in a distribution department is the provision of prompt service in the case of fire, serious leakage, or other emergency. To meet this contingency a day and night service has been instituted which has proved of great value. We have fitted a 14 H.P. motor van with a complete set of tools. During the ordinary working day (7.30 a.m. to 5.0 p.m.) a driver who has been trained in our Works deals with all emergency calls, and when required he transports men and materials to deal with the case. From 5.0 p.m. to midnight a night man similarly trained takes over. In addition, this man changes the recording charts in the several high-pressure governor stations and ensures that all is well in each.

The night man is connected at home by telephone to the Works, the police and fire stations, so that he is able to

give prompt attention during the hours of 12 midnight to 7.30 a.m.

While the development of the distribution system was in progress, the reorganization of the staff was put in hand. The amount of work coming through the Department was growing enormously, and the existing staff was unable to cope with it. Drastic alterations in the method of working had, therefore, to be made.

A sales section had also to be developed, and this proved a rather difficult, yet interesting, problem, as it brought out many somewhat surprising points. As an instance, was a man trained in our own shops as a gas fitter capable of being turned into a first-class salesmen comparable with men who were trained for sales only? I say, without hesitation, yes. He is a better man in this sense; in his years of apprenticeship he is in close touch with the consumer, and learns to appreciate their point of view as well as that of his Department. This outlook makes him " service " as well as " sales " minded.

It has always been our policy to give trained men in our own Works promotion, provided their qualifications are satisfactory. All youths when entering the Distribution Department are expected to attend the technical school for training, the Gas Department defraying all their expenses. After passing through the intermediate grades they are posted to first-class gasfitters only when they produce their City and Guilds Final Certificate. They are then encouraged to take up Gas Supply and Domestic Gas Salesmanship. This training, coupled with his apprenticeship, gives a man a far better outlook upon his work and fits him for " a step up " as opportunity arises. It is from this type of man that I have largely built up the Sales Staff. All work is now sectionalized, and each man thoroughly understands his job.

For administration purposes the gas area is divided into:

(1) Six districts for district salesmen.

(2) Four districts for fittings inspectors and fitters.

(3) Twelve districts for Maintenance Inspector and men.

These divisions were found most suitable and easy to work for this particular system.

Bonus Scheme.

Some four years ago I instituted a scheme whereby bonus was paid to workpeople employed by the Undertaking (with the exception of those engaged in actual sales—*i.e.*, the showroom staff and district salesmen) for all enquiries they sent in for appliances which resulted in a sale. Each man is provided with a duplicate enquiry book, sending in one copy to the showroom. The men showed great keenness, and the outcome of the Bonus Scheme was phenomenal.

Bonus Scale.

DOMESTIC.

	s.	d.		s.	d.
Cookers	2	0	Hotplates	0	6
Gas fires	2	0	Gas irons and burners	0	6
Circulators and geysers	3	6	Clothes dryers	2	0
Radiators	2	0	Outdoor shop lamps	1	6
Towel rails	1	0	Indoor shop lamps	0	6
			Wash boilers	1	0

INDUSTRIAL.

	s.	d.		s.	d.
Large cookers (double)	4	0	Large boilers	2	0
Steamers	3	0	Large hotplates	2	0
Hot closets	3	0			

Other apparatus in proportion.

The most remarkable point in this matter is that the gasfitters and maintenance men have become so gas-minded that the bulk of the work of the salesmen is done before they arrive at a house. It is not an easy matter to keep men so keyed up, and I am of the opinion that any steps which may be taken, within reason, to maintain this interest are definitely worth while.

Tradesmen Plumbers.

Encouragement is given to every plumber in the area to be a representative of the Department. A commission is allowed at the rate of 10% for all apparatus sold by him. He is provided with a prepaid business reply card, on which he deletes the words not required and fills in the consumer's name and address. After a sale has been effected the commission of 10% on the fixed article is credited to him.

Plumbers with good showrooms are loaned appliances for display purposes, and these are changed each month. Should a consumer desire his own plumber to fix the apparatus, the plumber may obtain the appliance through the Department at 5% on net cost. The apparatus is delivered to the consumer's premises free of cost.

These terms are far better than he can obtain through any builder's merchant or appliance maker, and it ensures that the apparatus he fixes is of approved manufacture.

Kindly note I have recommended

Mr. _____

of _____

_____

to purchase GAS COOKER, FIRE, GEYSER, BOILER, POKER

(Please delete articles not recommended).

Signed _____

Address _____

Date _____

Builders' Concessions.

To encourage builders to lay services to all new property special terms are allowed; 30 ft. of the private portion of the service is allowed free, providing the builder will lay an internal pipe in a position for a cooker and wash boiler. Should the service be over 30 ft., a further ten shillings for each point which he will lay is allowed off the balance (if any). In most instances this enables the builder to obtain a service free of cost. We find the allowance thus made to the builders is recovered in the form of fixing charges put on each appliance. All articles are quoted " fixed free." The fact that pipes are laid in the house before completion is a great help to the salesmen in obtaining orders for various appliances, and is often found to be a deciding factor in favour of gas.

District Salesmen.

Six district salesmen have been appointed from the fittings staff. Each man has taken Certificates in all Grades of Gas Fitting, the Final City and Guilds, and the Domestic Gas Salesmanship Course. They are under the control of the Sales Manager, and report for duty at 8.0 a.m. and up to 9.0 a.m. have collected all enquiries sent in by the fitters, &c., the previous day, and all other clerical matter relative to their day's work. They set out promptly at 9 o'clock on cycles. Each man is provided with two log books for use on alternate days. On these are entered the whole of his enquiries and reports of work completed and uncompleted. One copy is left in the showroom containing the previous day's work for examination by the showroom manager.

Being a practically trained man, immediately he effects a sale (he is provided with the necessary stationery and agreement forms) he measures up the work for piping and all fittings required, and enters this on the job card as soon as he returns to the showroom. This saves a considerable amount of time and eliminates a second visit.

The district salesman usually finishes his round about 4·0 p.m. He returns to the showroom and presents his work to the showroom manager, who has the works cards entered up and despatches them the same evening to the stores distribution department. This method has been found to save one complete day. The district salesmen also undertake the measuring up of all services to new property (probably an unusual practice). After taking the measurements the salesman costs the job up, and sends the information to the accountancy department, from where a demand note is sent direct to the builder for payment. No credit for internal piping is given until the work is approved.

The reason for transferring this part of the service department's work to the salesmen is that they are enabled to get first-hand information regarding the prospective owner or tenant and can get into touch immediately with him. They invariably effect a sale of a cooker, water heater, and copper before our competitors appear.

Fittings' Inspectors and Men.

The district for fitting work is divided into four districts, and a fittings' inspector is placed in charge of each. These men are highly trained and are responsible for the correct fitting of domestic and the smaller industrial appliances in their separate districts. We are not, however, bound by any red tape in this matter. Should a particular district become short of work, as may occasionally happen, the inspector arranges his work in other districts which are busy—delays in executing work are therefore eliminated. The inspector visits every job during progress, and on completion obtains the signature of the consumer on the works card, indicating that the job has been carried out to his or her satisfaction. This method reduces complaints to a minimum. The fittings inspectors make contact with the

industrial and domestic showrooms, so that special work can generally be prepared for in advance.

In close touch with the fitting department, a maintenance section has been established, consisting of an inspector and twelve men. In this case the area of supply is divided into twelve districts, one man being placed in each. Any complaints (if any) are issued to the men in their districts each morning. Their services are given free to the consumer; they keep in order lighting, heating, and cooking appliances, charges being made only where replacement of parts are required. These men visit the consumer approximately once a quarter and thus ensure that he is receiving the best value from his appliances. The inspector makes check visits in each district. The system works admirably, and a far better feeling exists between the consumer and the department. It has been found that by keeping men constantly in their own districts they become well known to the consumers and are repeatedly asked for to give advice in the matter of new appliances. The maintenance men have been found a great help in promoting sales.

In January of this year, when the reorganization of the whole of the sales department came into operation, it was placed upon a footing which, unusual though some items may appear to you, I am satisfied has made for better working. The central showrooms have been made, in practice, the hub of our development. All the work emanates from there, whether its origin be the sub-showrooms, the town hall, maintenance and fittings staff, or plumbers' introductions.

Demonstrations.

To supplement work undertaken by the salesmen, fortnightly cookery and washing demonstrations have been held in the central showrooms during the year with the exception of July and August. These demonstrations have been so appreciated by the consumers that, for the last twelve months, small presentations, with a vote of thanks, have been made, spontaneously, to the demonstrators.

It has been found that to provide cups of tea and a biscuit at each lecture has been a great attraction, but it was also discovered that the whole of the audience could be kept to the end of the lecture by the issuing of tickets which would entitle each member to participate in a draw for the whole of the meal which had been cooked. The counterfoils are usually drawn by a member of the audience.

Advantage has also been taken of exhibitions or agricultural shows in any part of our area. We have staged an exhibit in a specially prepared stand, designed on the lines of the B.C.G.A. model, and have recently exhibited at Bramhall, Poynton, and Stockport Agricultural Shows, from which we have had some very good propaganda through the local Press. It has also enabled us to keep in touch with consumers whom we would not otherwise get in our local showrooms.

Appliance Sales.

From the comprehensive scheme which has been evolved, and the assistance of the builders and plumbers in the town, combined with sub-showrooms, advertisements in the majority of picture houses, on programmes, &c., permanent posters in the town, and lorry poster service, the sales of appliances through the showroom during the period under review have been very gratifying. The figures given hereunder do not take into account simple hire or free apparatus, but only refer to cash and hire-purchase sales:

	£		£
1930. . . .	8,210	1933. . . .	43,832
1931. . . .	12,013	1934. . . .	41,681
1932. . . .	25,951	1935. . . .	43,339

We have been fortunate enough to write off the books of the Undertaking the whole of the simple hire and free apparatus.

Commencing this financial year (April 1, 1936), therefore, advantage was taken of the Gas Undertakings Act, 1934, Section 7 (2), to discontinue the issuing of free and simple-hire apparatus, and to bring into line all gas consumers on the same basis of charge. Previously prepayment consumers were charged on a flat rate for any quantity. This change meant an immediate reduction to prepayment consumers of at least 7d. per 1,000 cu.ft., with a further reduction according to the amount of gas consumed (on our step system of charge). We made no mechanical change in the meters, but increased the rebate proportionately. This increase amounted to 50% or more.

You will see, therefore, that sufficient money was returnable to the prepayment consumers at the quarter's end to defray the quarterly payment of any hire-purchase apparatus they chose to order.

The existing apparatus on the district was dealt with in a simple manner; consumers were notified by letter that any apparatus which they had on simple-hire would become their own property automatically at the end of five years by continuing the simple-hire payment in existence at that time—*i.e.*,

s.	d.		
2	0	per quarter for	cookers
1	6	,, ,,	gas fires
1	0	,, ,,	grillers

The result of this offer was not quite as anticipated. We were immediately inundated with orders for new apparatus. As soon as the new method of gas charging was made clear to them, and that the rebate in the meter was now sufficient to defray the quarterly payment of any new apparatus, black cookers were returned in very large numbers, and the consumers placed orders for enamel cookers. The feeling of the consumer was, obviously, "if we are to buy a cooker we will have an up-to-date one." Needless to say, I have broken up a large quantity of black cookers, for which there is now no demand, and in consequence we now have a far more satisfied consumer.

The sale of new apparatus throughout the showrooms since the scheme started—*i.e.*, six months (April 1, 1936, to Sept. 30,1936)—has already reached £39,000, and the sales show every prospect of continuing for a considerable period.

The total gas increase in the whole period under review—*i.e.*, 1930 to Sept. 30, 1936—is 156 million cu.ft. of gas, or 13·5%.

It is interesting to note that the number of employees in the Distribution Department in September, 1930, was 163, whereas the total number in September, 1936, is 278, an increase of 115 men.

The price of gas in 1929-30 to ordinary consumers was, on the step system of charge, from 4s. to 1s. 10d. per 1,000 cu.ft.

The price of gas to prepayment consumers was 4s. 7d. per 1,000 for any quantity.

The price of gas in 1936 to all classes of consumers now equals 3s. 6d. to 1s. 6d. per 1,000 cu.ft. according to consumption.

Discussion.

Mr. E. CROWTHER (Salford) said that the Paper was a record of sound work though it was not spectacular. One remarkable point was the speed with which Mr. Reynolds appeared to have been able to produce order out of a state of chaos, or, at any rate, out of a mere void. In regard to the main-laying programme, one was bound to agree that there were many circumstances in which high-pressure supply was really the only practicable way of reinforcing pressures in the more remote parts of a district. Were the governors set to give pressures at the time of maximum demand, or at some lower average demand of pressure? If the former, had Mr. Reynolds found that the introduction of his feeder system had had an adverse effect upon the leakage in the undertaking? One admired his attempt to equalize all governors by mains pressures throughout his district. Possibly the elevations of the district were such as to lend themselves to do this. In a more hilly district it would either be impossible to do it, or, alternatively, he imagined it would be impossible to link up on the low-pressure side of the job. In connection with the linking up on the low-pressure side, even with moderate differences of elevations, one imagined with the times of "lightish" load some governors would be closed down, and one or two others would be feeding more districts than their own. Whether this was a disadvantage or otherwise was doubtful. He would like to know something concerning the construction of the governor chambers. Were the houses built above ground on sites acquired for the purposes, or were they sunk in underground pits? If the latter, how were they drained, or how were they made watertight? The sales organization spoke for itself. One had only to look at the results of sales of appliances to realize that Mr. Reynolds' methods were amply justified by the only test that mattered, namely, the results.

Mr. A. L. JENNINGS (Spenborough) observed that Mr. Reynolds had endeavoured to obtain a straight chart of his district at all times of the day. Some interesting information had been given, the Author stating that every time the mains men opened a main they had to fill in a chart stating the name of the street, size of the main, depth of the main, and other particulars, together with the date exposed. This was a very simple method of obtaining data, and might well be copied by many undertakings. In Spenborough bonuses had been given to everyone in the outside departments for several years with the exception of the showrooms; 2s. 6d. per cooker, 2s. 6d. per fire, and 1s. 6d. per wash boiler. Meter inspectors, fitters, &c., were constantly going into people's houses, and if they were on good terms with the people they might as well try to advance the interests of the undertaking for which they worked.

Mr. Reynolds had mentioned that he had twelve maintenance inspectors, and that they visited all the consumers practically four times a year, keeping the lighting, heating, and cooking appliances in order. Assuming the number of consumers was 46,000, apparently these maintenance inspectors made 184,000 visits a year. Allowing 51 weeks in the year, it meant that

300 consumers were visited per maintenance inspector per week. Taking 47 hours per week this meant the visit of each maintenance inspector to each consumer was of the duration of nine to ten minutes. There was an old maxim which ran: "Good wine needs no bush." Well, a maintenance system for gas was not a wine, but he suggested it was somewhat in the nature of a liqueur, and that it required serving in small glasses. He rather suggested that it was giving the impression to the consumer that gas was something which had to be constantly followed up if it was to be satisfactory. If they were only going to be in the house a matter of nine to ten minutes, it seemed to him they were practically going to have time just to say "How do!" In his own case, it was found that maintenance examiners took about 40 minutes per house, and that they paid a visit practically once a year. In Mr. Reynolds' case, probably, the maintenance examiners would be paid something in the nature of 1s. 6d. per hour, and the service would cost about £2,500 per year, or in the region of about ¾d. per 1,000 cu.ft.

Mr. Reynolds' Reply.

Mr. REYNOLDS said that the governors were set at 7 in. as a maximum pressure, but the pressures were controlled by secondary governors when the maximum demand for gas was not required. The pressure usually was controlled by the compressors. When the pressure builds up in the main, and was not required on the district, it automatically cut the steam down at the compressors, so that the pressure controlled the compressor. The houses were all above ground, and built of brick and slate, or brick with a concrete roof. They were usually of a similar description to the surrounding property, so that they matched the district. As an instance, in Cheshire they had gone to some expense to make them black and white in order to suit the district; they were built of timber and brick.

He had only one industrial salesman at the present time, and he had to thank Col. Carr for his training as he obtained him from Stretford. He had done a very great deal of good work. He, the speaker, had thought at one time that Mr. Jennings was going to tie him in a knot with his figures, but matters did not quite work out in the way that that gentleman had postulated. The appliances in a large number of the houses that the maintenance men called at did not require any attention whatever, thus leaving a greater margin of time for inspection in other cases. About 250 houses were visited in the course of the week by each man.

The pressures on each district varied according to the consumption. For instance, at breakfast time it was necessary to increase the pressure. He did not anticipate getting a straight line on the job; it would have to vary according to the demand. At breakfast time it might be necessary to put it up 5 in., but immediately afterwards it might drop down to 4 in. At dinner time it might have to go up to 7 in. It would then drop down during the afternoon, and so on according to the demand; but on a straight chart it would be similar in each district.

Motor Fuels from Coke*

From the Melchett Lecture delivered to members of the Institute of Fuel and other Societies at the Institution of Mechanical Engineers, Storey's Gate, S.W. 1, on Thursday, Oct. 15.

by

Prof. Dr. FRANZ FISCHER,

of the Kaiser Wilhelm Institut, Mülheim-Ruhr.

The first reliable data concerning the formation of hydrocarbons from carbon monoxide and hydrogen are contained in the patents of the Badische Anilin und Sodafabrik of 1913. When, according to these patents, catalysts are used at temperatures of about 400° C. and at pressures of 100 atmospheres (1,420 lb. per sq.in.) and more, hydrocarbons and their oxygen derivatives of a wide range of boiling points are obtained. From these patents the I.G. Farbenindustrie developed later the high-pressure synthesis of methanol from carbon monoxide and hydrogen.

In the years 1922-23 I found, in conjunction with my collaborator, Tropsch, that in the presence of an alkaline iron catalyst at a temperature of 400° C. and at a pressure of 100 atmospheres (1,420 lb. per sq.in.) oxygenated compounds are produced, which consist of alcohols, aldehydes, ketones, and fatty acids. Actually, about 17 individual compounds were isolated and indentified. The mixture of these oxygenated compounds produced at high pressure was called, for the purpose of simplicity, "Synthol."

In conjunction with Zerbe, I found that as the pressure falls, but under otherwise similar conditions, compounds containing less and less oxygen are formed. At seven atmospheres (99·4 lb. per sq.in.) an oil is obtained which consists principally of hydrocarbons of paraffinoid character. At the same time the rate of reaction falls progressively with the reduction in pressure.

This discovery pointed to the fact that the synthesis of pure hydrocarbons from various monoxide and hydrogen must be carried out without the application of pressure. It now became necessary to develop catalysts which at atmospheric pressure possessed sufficient activity to counteract the reduced rate of reaction.

The Synthesis of "Kogasin."

In 1925 Tropsch and myself were able to record the first success at atmospheric pressure. It became evident that in order to ensure that the already highly active catalyst maintained a fairly long life it was necessary to work at low temperatures—namely, between 200° and 300° C. instead of 400° C. This reduction in temperature slowed down the reaction velocity still further, which again had to be counteracted by an additional increase in the activity of the catalyst. After Dr. Tropsch had left me in 1928 in order to found the Czecho-Slovakian Institute for Coal Research at Prague, it took another six years before my other collaborators, particularly Herbert Koch and Karl Meyer, and I produced catalysts which, while possessing a sufficiently high reaction velocity below 200° C. without the application of pressure, remained active for several months. In the course of these investigations actually thousands of catalysts were tried during our experiments, often extending over weeks and months.

Purification of the Process Gases.

During this period we did not confine ourselves to the development of catalysts, but also undertook other work which has been published in technical literature. At a "scout" plant erected at the Institute two further problems important to the petrol synthesis received attention. In the first place, it was necessary to purify the water gas, or the final mixture of gases ($CO + 2H_2$) as required for the synthesis, sufficiently from organic sulphur compounds to ensure a long life for the catalyst—the sulphur content of the gas must not exceed 0·2 gramme of sulphur per 100 m^3 (0·087 grains per 100 cu.ft.). After much painstaking research, my collaborator Roelen developed a satisfactory cheap process which meets the conditions imposed by the hydrocarbon synthesis.

The Reaction Chamber.

The other problem which had to be solved arose when we translated the laboratory results to a plant of 2,500 times the size of the laboratory apparatus, where the process, however, was still operated on a small scale. While the water gas process, using, for instance, coke and steam, is strongly endothermic, the formation of aliphatic hydrocarbons, as, for instance, "gasol," petrol, diesel oil, paraffin waxes, is exothermic. When the conversion is complete, the heat of formation amounts to no less than 20% of the potential heat of the gas, corresponding to about 600 calories per m^3 (67.3 B.Th.U. per cu.ft.). This amount of heat is sufficient to raise the temperature of the gases by several hundred degrees Centigrade, whereas the synthesis demands 190° C. as the optimum temperature, and permits very little variation from this optimum. In the course of years my collaborator Roelen and myself designed many types of reaction chambers, in which the dispersion of the heat of reaction was attempted in various ways—for instance, by cooling with air, by circulation of the diluted process gases, by moving the catalyst, with the aid of water, and the circulation of oil. A number of these designs have been published but not the final construction, which was handed over to the Ruhrchemie A.G. The latter builded on the lines of our designs a large-scale research plant. For the use of the commercial plants, the reaction chambers have been further simplified and improved.

With the solution of the above two problems, namely, the purification of the process gases and the dispersion of the heat of formation, the process was ready for exploitation on the large scale.

As far as the manufacture of the process gases is concerned, it is essential that they have a higher hydrogen

* Translated from the original German by Dr. G. W. Anderson.

content than ordinary water gas. Such gases can be produced by several old and new processes which use coal, semi-coke or high-temperature coke as raw material. I should like to mention only one process—namely, the one developed by my collaborator Pichler and myself, for use on both the small and large scale. It produces direct a gas containing carbon monoxide and hydrogen in the ratio of $1\,CO:2H_2$ at a minimum consumption of coke. It has been designed with a view to establishing the process at coking plants and differs from the ordinary water gas process in that during the gas-making period, instead of steam alone, a mixture of steam and coal gas is admitted to the generator. The methane of the coal gas being converted into carbon monoxide and hydrogen in the ratio of 1:3 raises, together with the hydrogen already contained in the coal gas, the hydrogen content of the water gas, so as to produce the desired ratio of $1\,CO:2H_2$.

To summarize the preceding paragraphs, the operation of the process consists of:

(1) Production of water gas or mixture of gases containing CO and H_2 in the ratio of 1:2.
(2) Preliminary purification from dust.
(3) Purification from hydrogen sulphide by any of the existing processes.
(4) Final Purification from organic sulphur compounds down to 0·2 gramme per 100 m^3 (0·087 grain per 100 cu.ft.).
(5) Passage of gas through the reaction chamber.
(6) Condensation of water and oil.
(7) Recovery of petrol and "gasol" from residual gas by means of active carbon.

The final purification of the gas, the composition of the catalyst and the design of the reaction chamber fitted with suitable devices for the dispersion of the heat of reaction, and thus for the maintenance of a constant temperature, are the special features of the process.

The Products.

In the operation of the process which has been adopted up to the present, the reacting gases pass over the catalyst only once. This simple procedure has been possible because the equilibrium in the formation of aliphatic hydrocarbons from carbon monoxide and hydrogen at a temperature of about 200° C. shows a predominant tendency towards the hydrocarbons. Under these conditions the process yield amounts to 110 to 120 grammes of hydrocarbons per m^3 of gas (6·8 to 7·5 lb. per 1,000 cu.ft.), consisting of "gasol," petrol, diesel oil, and paraffin waxes.

It is possible to increase this yield so that it almost approaches the theoretical yield, but the process becomes thereby more complicated. The relative quantities of "gasol," petrol, diesel oil, and paraffin waxes are, for instance, as follows, in per cent. by weight: "Gasol" 8, petrol (boiling up to 200° C.) 62, diesel oil 24, paraffin wax 2, ceresin 4.

The relative yields of the individual constituents can be varied by altering the operating conditions. Petrol, however, is at present the principal product. The gasol is recovered from the residual gas, the paraffin wax from the oil, while the ceresin, which has a melting point of over 80° C., is extracted from the catalyst. By suitable treatment the raw product can be split up into synthetic ceresins of melting points ranging from 100° to 120° C. which are unique in character.

All the products possess a high degree of purity and a pleasant odour. They are colourless and entirely free from sulphur, so that they require no further treatment, except a wash with alkali in order to remove traces (a few tenths of 1%) of fatty acids.

The boiling-point curve of the petrol is quite smooth. When petrol is used in a modern internal combustion engine, it is important to know whether the anti-knock properties of the petrol and thus its octane number can be improved. We have found that our petrol and diesel oil, like the other products, consist mainly of aliphatic hydrocarbons, in which the carbon atoms form a straight chain. This constitution is an advantage in the case of diesel oils, but it is not desirable in the case of petrol, as the higher boiling constituents possess no anti-knock properties. Since the petrol motor uses the lower boiling fractions, whereas the diesel motor runs on those of higher boiling point, it is only necessary to improve the anti-knock properties of the lower boiling fractions. The object can be achieved in different ways, as, for instance, by the addition of alcohol, as prescribed by German law. Likewise, benzole or benzole and alcohol can serve the same purpose. The addition of 0·5 c.c. of tetra-ethyl-lead per litre—that is to say 0·05% by volume—raises the octane number of the petrol to a sufficient degree.

Motor spirit can be treated without making additions by a process known in America as "reforming" by which the content of aromatic hydrocarbons is increased in order to improve the anti-knock properties of the spirit. These processes exploit by no means all the possibilities existing in this direction. There are many other methods that can be used to increase the octane number of our petrol and so improve its anti-knock properties. For instance, a process known as "isomerization" seems promising for this purpose.

As already mentioned, the higher boiling fractions of our product (up to about 300° C.) are on account of their chemical constitution the best type of fuel for diesel engines, particularly high-speed engines. It has been found that the calorific value of these oils is approximately 10,470 calories per kg. (18,846 B.Th.U. per lb.) and that the consumption per h.p. hour is less than 190 grammes (0·42 lb.). It is known, however, that aircraft diesel motors exist which use not more than 170 grammes (0·375 lb.) per h.p. hour of ordinary diesel oil, so that the consumption in the case of our diesel oil with its high hydrogen content should be less. Our diesel oil "Kogasin II" possesses excellent combustion properties, gives a clean exhaust even in the case of overload, and causes no knocking, which usually occurs in diesel engines, being ascribed to delayed ignition.

With regard to the low-temperature properties of our petrol, "Kogasin I" and our diesel oil "Kogasin II," it has been found that the solidifying point of the former is below −60° C. and that the solidifying point of the diesel oil, from which the paraffin wax is removed by freezing out, is below −30° C.

Lubricating Oils.

The task we set ourselves was the production of motor fuels from coke or coal by way of carbon monoxide, but the solution of the problem would have been incomplete if Herbert Koch and myself had not found a material in "Kogasin" which can be converted by means of old or new methods into lubricating oils. The material is the mono-olefines contained in "Kogasin." The conversion of these olefines into lubricating oils can be effected, for instance, by the addition of a few per cent. of aluminium chloride, according to an already known method.

The following table contains a comparison between a well-known mineral motor oil (winter grade) and the corresponding "Kogasin" lubricating oil. The table also gives information with regard to the properties of a "Kogasin" aircraft motor oil, which has been produced by removing certain less viscous constituents of a "Kogasin" lubricating oil by vacuum distillation.

—	"Quality" Automobile Oil (Winter Grade).	"Kogasin" Lubricating Oil (Winter Grade).	"Kogasin" Aircraft Oil.
Specific gravity at 20° C.	0·882	0·839	0·855
Viscosity (degree Engler) —			
At 20° C.	32·6	32·0	125·9
At 50° C.	6·29	6·29	18·7
Viscosity index	81	84	98
Solidifying point, ° C.	−16	−42	−30
Flash point, ° C.	220	205	282

The comparison shows that the "Kogasin" lubricating oils are of first-class quality, particularly with regard to their solidifying point. "Kogasin" lubricating oils have not been examined solely with regard to the properties mentioned above, but have been subjected to all the other usual tests and have been found perfectly satisfactory, in fact, in many instances better than the natural products.

Before concluding this section on petrol, diesel oil and lubricating oils, I should like to mention that all these products are already successfully employed in the motor industry of to-day. Diesel oil has been used in a Mercedes-Benz light car which is equipped with a diesel engine of latest design. It is trouble-free, and owing to absence of sulphur, produces no objectionable odour, an advantage when used in diesel engines for light motor vehicles.

Carbon monoxide is an important raw material not only for the synthesis of petrol, diesel oil, and lubricating oils, but also for the manufacture of other products essential to the motor industry. One's mind naturally turns to synthetic rubber, the importance of which in connection with road vehicles need not be emphasized. The acetylene required for the process can be obtained from carbon monoxide through the "Kogasin," which is easily split into ethylene or acetylene and other products. A further possibility is the production of carbon black, which is extensively used in the rubber industry, by the decomposition of carbon monoxide under suitable conditions, according to the equation

$$2CO = C + CO_2.$$

There are already some indications that "Kogasin," "Gasol," petrol, and paraffin waxes lend themselves to further chemical treatment, which opens a wide field in this industry, particularly on account of the high degree of purity and uniformity of "Kogasin" products.

London and Southern District Junior Gas Association

THE NEW PRESIDENT.

Joining the Luton Gas Company in 1918, Mr. Summerson was a pupil of Mr. Wm. Phillips, Engineer and General Manager, for four years. He then spent three years as Clerk of Works on gas and water works construction in various parts of the country, returning to Luton in 1925 to take up his present position of Technical Assistant. Mr. Summerson obtained The Institution of Gas Engineers' First-Class Diploma with Distinction in Gas Engineering in 1928. Mr. Summerson also holds the City and Guilds Bronze Medal and the Milbourne Silver Medal.

Presidential Address

OF

ROY SUMMERSON

I. COKE.

Introduction.—Coke is by far the most important by-product of the Gas Industry. It may, indeed, be a mistake to regard it as a by-product at all. I would prefer that it should be regarded as one of two first-class fuels produced by the Gas Industry, the one gaseous and the other solid, both of them smokeless. Each has its own particular sphere of application, quite well defined. If in either of these particular spheres there should arise circumstances which indicate that there might be ample scope for profitable development, then that development should be pursued with vigour, and manufacturing methods adapted accordingly.

For example, the successful appearance in recent years of the open coke grate suggests to me immense possibilities in the displacement of coal by coke in the domestic open fireplace. In what follows, I have endeavoured to direct your attention to a consideration of this subject and what it entails.

A. Domestic Coke Consumption in the Open Coke Grate.

Smoke Abatement.—For many years I have been an advocate of smoke abatement. The situation of Luton long ago impressed upon me the extent to which the atmosphere above towns can be polluted by smoke. Luton is situated in the valley of the River Lea, in a hollow in the Chiltern Hills. To view the town from the surrounding hills on a winter's day is to be impressed with the magnitude of the work to be done in the abatement of smoke from the factory and the domestic chimney. The majority of the factories in Luton are modern and are mainly engaged in the lighter engineering trades and in hat manufacture. These factory chimneys do add somewhat to the general pollution of the atmosphere, but from observation of the town as a whole, it would appear that the greater part of the smoke produced issues from the domestic chimney. What is true of Luton is probably true of many towns, particularly in the South of England.

It was, therefore, with considerable pleasure that I noted the introduction of the open coke grate some years ago by the South Metropolitan Gas Company, as a contribution to the work of smoke abatement. It has been of considerable interest to me to make observations of the behaviour of these and similar grates, as compared with coal grates.

The Opening Meeting of the London and Southern District Junior Gas Association was held on Friday, Oct. 16, at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C. 1, Mr. J. M. WEBBER, the retiring President, being in the Chair at the outset.

The minutes of the Annual General Meeting, as read by Mr. H. J. RISBY, Assistant Hon. Secretary, having been adopted, the PRESIDENT said that he had now come to one of the happiest duties he had to perform in his year of office. That duty was to welcome Mr. Roy Summerson, their new President, and to wish him the best of luck in his coming year of office.

On taking the Chair, Mr. SUMMERSON said that on behalf of the members he had much pleasure in making a presentation to Mr. Webber. The retiring President by his conduct of their meetings had earned the regard and esteem of all. Presenting a suitably inscribed silver bowl to Mr. Webber, the President asked him to accept it both as a mark of the Association's esteem and as a memento of his happy year of office.

Returning thanks, Mr. WEBBER said he appreciated the presentation very deeply. He had something which he would have by him all his life; and, while he would derive great pleasure from the possession of the memento, it would serve to preserve the many happy memories of work on the Council and as President. He then thanked the Council and Mr. Higton for their wholehearted support and work during his Presidential year. It would have been impossible to have carried on without their help.

Observations on Coke Grates.

Flue Dust Produced.—The absence of smoke production is one of the good points in coke grates. The absence of soot production is another. Though it may be unwise to claim that a coke fire chimney will never require sweeping, it is true to assert that sweeping will be required only at very long intervals. One of the rooms in my house, which was new when I went into it seven years ago, has been heated continuously during the winter months by an open coke grate. At no time during that period has it seemed necessary to sweep the chimney. At the end of the seven years, by which time the coke grate had consumed over twelve tons of coke (together with a certain amount of paper and refuse thrown into the fire occasionally), the chimney was swept in order to find the amount of flue dust accumulated in the flue during that period: (1) 5¾ lb. (280 cu.in.) of flue dust was first raked out from the base of the chimney, at the top and back of the firebrick; (2) 6¼ lb. (240 cu.in.) of flue dust was obtained on sweeping the chimney. Thus, the whole of seven years' production of flue dust could be contained in a box 5 in. by 8 in. by 13 in. There was a certain amount of mortar rubble and fibrous matter present in the flue dust, and in the case of the dust from the base of the chimney there was also some paper. After removing most of the rubble, fibre, and paper by screening on a 30 mesh screen, the two samples of flue dust were analyzed by the B.S.S. method for ash and method B for volatile matter; a typical coal fire soot was similarly analyzed. The results obtained were:

—	Coke Grate (1) Flue Dust from Base of Chimney.	Coke Grate (2) Flue Dust from Chimney.	Coal Fire Soot.
Bulk density, gm. per c.c.	0·66	0·63	0·51
Volatiles, %	15·4	20·5	37·0
"Fixed carbon," %	30·0	25·3	26·1
Ash, %	54·6	54·2	36·9
Colour	Grey: lighter than (2)	Grey	Black

The comparison with soot shows that the flue dust produced from coke fires is probably less likely to catch fire in the flue, and that when the chimney is eventually swept, the flue dust is heavier and less likely to disperse itself all over the room.

Bulk Density of Coke.—One important advantage which coal has over coke is its greater bulk density. This is a

quality of considerable domestic importance, often not properly appreciated until the change over is made from coal to coke, when it is discovered that the coke takes up more storage space, the bin or scuttle requires more frequent filling, and the fire may require more frequent charging. It seems to me to be a point worthy of considerable emphasis that cokes manufactured for the domestic market should be of the highest possible bulk density, provided that ready ignitability and ready combustibility are not sacrificed.

The Volume of Ash from Coke.—Although the coals carbonized by my Company are high quality gas coals with an ash content of from 3 to 5 or 6%, it has seemed to me that the volume of ash and unburned fuel falling through the grate is somewhat excessive, especially when compared with the volume of ash obtained from a high quality household coal when burned in a typical coal grate. This observation prompts two reflections: First, that a useful investigation might be carried out on the bulk densities of coal ash and coke ash with the object of determining whether the bulk density of coke ash is lower than that of the ash obtained from the coal from which the coke was made; whether different grades of coke from the same coal give ash of differing bulk density, and so on. Such an investigation would incidentally necessitate the standardization of a method of determining bulk density of ash. Second, that if a British Standard Specification should be produced for domestic open coke grates, it would be desirable to specify a certain minimum cubic content of the ash pan, as has been done in the case of coke boilers. An ash pan which would contain the whole of one day's ash production and in which the ashes could be carried away in one journey without spillage is a very desirable feature. The effect of the ash in the fire itself has been dealt with elsewhere.[1]

Consistency of Performance.—It is a point of primary importance that the quality and combustion characteristics of coke supplied to domestic consumers should be reasonably consistent. I have found that much annoyance may be caused to consumers by the differing behaviour of successive consignments of coke. Consistency of performance in coke could be achieved by setting aside a portion of the carbonizing plant for the production of domestic coke and by carbonizing a selected type or mixture of types of coal under strictly controlled conditions. Indeed, it is very desirable that the whole of the coal carbonized on gas-works should be a uniform mixture of coal. The provision of a suitable storage and mixing plant may be somewhat costly, but it would undoubtedly lead to the production of a uniform type of coke and would at the same time stabilize carbonizing conditions with consequent improvement in results.

Radiation and Comfort Conditions.—A certain amount of research has been performed in recent years on the quality of the radiation emanating from gas fires and its bearing on comfort conditions. So far as I am aware, no corresponding work on coke fires has been performed. This is a very wide subject, but in view of the enormous sums spent annually on domestic fuel it should prove worth while to make some attempt to define scientifically what constitutes the well known comfortable conditions given by the open fire and to determine whether there is any measurable difference between the conditions resulting from the combustion of coal and of coke in open fires. Such data would give some enlightenment as to whether the preference of some people for coal fires above all others is really justified or is based on prejudice and conservatism.

The Potentialities of the Market for Open Coke Grates.—Although there may be minor points in which the design of the open coke grate could be improved, and although much has yet to be learned on the production and combustion of coke, there can be no question that the Gas Industry can supply an admirable smokeless solid fuel for combustion in open grates of proved success. The amount of business to be secured in this field will be determined purely by the energy with which it is cultivated and by the readiness of the Gas Industry to meet the demand created. That there is a large potential market I am convinced, for I am persuaded that there are many people who have never even heard of the open coke grate.

B. COKE PRODUCTION.

In my experience, the average annual consumption of coke on one 14-in. "Metro" coke grate in use for heating a room for about 15 hours daily during the seven winter months is 35 cwt. In the London area, for every 10 cwt. of coke sold, approximately 73 therms of gas are sold.[2] If, therefore, it be assumed that every open coke grate in regular use consumes 35 cwt. of coke per annum, every additional grate installed for regular use will necessitate the additional sale of at least 250 therms of gas per annum under present carbonizing conditions, if a supply of coke is to be guaranteed by the Gas Industry in this area. That is a minimum figure, since by no means all of the coke at present produced for sale is, or could be, of a grade suitable for open coke grates. Unless, therefore, gas sales can be expanded at a considerable rate, it would appear likely that coke demand will outstrip supply if coke grates continue to be installed in considerable numbers.

Increasing demands for domestic boiler coke and central heating boiler coke will accentuate the shortage. It may therefore be opportune to consider ways and means of increasing coke production.

Of the many possible ways of increasing coke production without at the same time increasing the production of gas for sale, I have selected only one for brief consideration here—namely, the possibility of firing retort settings by coal gas. The advisability of applying this or any other method will, of course, be determined by financial and local considerations which each undertaking must evaluate for itself. Concerning the use of gas on gas-works for such purposes as the firing of retort settings, it may be pointed out that no appreciable distribution charges are involved and that complete purification of the coal gas to be used is not always essential.

The Possibility of Firing Retort Settings Partially or Wholly by Coal Gas.—Some experimental work was carried out in 1928-29 by the Woodall-Duckham Company in conjunction with the Luton Gas Company at Luton on the firing of a downwardly heated continuous vertical retort setting by coal gas. A brief description is given here not so much to draw attention to the particular technique employed on this occasion as to indicate the increased coke production that would follow from the firing of retort settings by coal gas.

The investigation was carried out in two stages: (1) On a setting of four 5-ton retorts with self-contained producers and recuperator. The coal gas was introduced into the producer gas stream in varying proportions. (2) In the same setting, on one side of one 5-ton retort, which was heated entirely by coal gas.

The partial firing of one downwardly heated setting of four 5-ton continuous vertical retorts by coal gas.—This investigation was designed to explore the possibilities of partial firing by coal gas and to find the upper limit to the proportion of coal gas it is possible to use while keeping the producer at work.

A 2-in. supply of purified coal gas was taken off the station meter outlet and taken across to the front of the producer, where it divided into two branches each provided with a cock. Each branch entered the producer at the "loose bricks" above the producer door, at a point about 2 ft. above the top of the cast iron door frame. The ends of the branches were stopped off inside the brickwork about 4½ in. from the coke. The quantity of coal gas was measured by the pressure differential across a calibrated orifice which was inserted in the 2-in. supply pipe at a point near to the station meter.

The proportion of coal gas used was increased in steps equivalent approximately to 7%, 15%, 30%, and finally 55% of the heating requirements of the setting. At each increase the primary air slides were reduced until standard temperatures, as gauged by pyrometer readings on top sighting block, check tile level, and up-cast flues were obtained. The area of the primary air slide openings were reduced from 10·5 sq.in. for normal producer gas working, to 3 sq.in. for 55% coal gas firing. During normal working, half the producer fire is cleaned every four hours; during the test, fire cleaning was reduced to half a fire each six hours when the coke gasified was two-thirds or less than normal. No special precautions were found to be necessary in turning off the coal gas supply when fire cleaning. The producer doors could be safely opened for occasional fire inspection without turning off the gas.

When small quantities of coal gas were being used, the CO distributing flues were under slight pressure as is usual with producer gas firing. With larger proportions of coal gas, the CO distributing flues were under slight vacuum (one to three hundredths of an inch "pull") owing to the smaller volume of combustible gas being required as the calorific value of the mixed gas increased. Satisfactory temperature distribution was nevertheless obtained.

Up to a proportion of about 15% coal gas firing, the combustion was almost flameless. Above this, a distinct coal gas flame was obtained which, when operating with 55% coal gas firing, so interfered with the satisfactory reading of temperatures on the top sighting block that the coal gas had to be cut off for a short time during this operation.

Economies to be Considered.

These investigations established that there is no technical reason why, if the economic values of coal gas and coke

warrant it, partial heating by coal gas should not be undertaken on retort settings suitably adapted or constructed for it. It was concluded that not more than 50% of the heating requirements should be satisfied by coal gas for this method of partial coal gas firing, since above this proportion producer conditions are not quite so stable without close supervision as is desirable for practical working. The coal gas must be supplied at constant pressure, with easily operated closing cocks and a plate orifice for each coal gas inlet. The primary air slides must be accurately set.

The increased yields of coke for sale that would result from such partial firing by coal gas would be as follows, assuming a recuperative setting of four continuous vertical retorts with a normal fuel consumption of 12% dry coke, and making 18,500 cu.ft. of 460 B.Th.U. gas per ton of coal carbonized, and assuming the total make of dry coke is 13·5 cwt. per ton.

Products.	Normal Producer Firing.	50% Producer Gas and 50% Coal Gas Firing.	Deviation from Normal per Unit Coal Carbonized.	50% Producer Gas and 50% Coal Gas Firing.	Deviation from Normal per Unit Gas for Sale.
Coal carbonized, tons	1	1	..	1·264	+26·4%
Gas made, cu.ft.	18,500	18,500	..	23,380	+26·4%
Gas made, therms	85	85	..	107·5	
Gas for sale, cu.ft.	18,500	14,640	−20·9%	18,500	..
Gas for sale, therms.	85	67		85	..
Gas used on producers—					
Cu.ft.	..	3,860		4,880	
Therms	..	18		22·5	
Coke made, cwt.	13·5	13·5	..	17·0	
Coke for sale, cwt.	11·1	12·3	+10·8%	15·5	+9·6%
Coke used on producers, cwt.	2·4	1·2	−50 %	1·5	

For the same make of gas for sale, therefore, the coke produced for sale would be increased by 39·6%, while the coal carbonized must be increased by 26·4%.

The firing of retort settings wholly by coal gas.—A series of experiments was carried out on one side only of one downwardly heated 5-ton retort. After a number of trials with various arrangements of pipes, it was found that satisfactory heating was obtained by a 2-in. diameter iron pipe placed in the CO distributing flue and having 1-in. diameter nipples directing a supply of partially aerated coal gas into each of the four heating flues. The aeration was given by an "Improved" venturi adjustable mixer connected to the 2-in. pipe in the CO flue at a point about 2 ft. 8 in. outside the setting wall. The venturi mixer was connected to the 2-in. service used for the previous tests on partial coal gas firing. The producer gas damper was closed and sanded over.

As a result of the investigations it was concluded that a 50/50 mixture of gas and air was necessary for the coal gas used, to ensure against the deposit of carbon in the flues by decomposition of the hydrocarbons in the coal gas. No trouble was experienced with explosions or lighting back, even when working with an aeration as high as 62% air. The gas supply could be shut off and turned on again without trouble.

There appears to be no technical reason why, in a suitably designed plant, all coal gas firing of continuous vertical retorts should not be entirely satisfactory. It may well be that new retort settings in the near future, or reconstructions of existing plant, will embody means of alternative firing by coal gas and hot producer gas, or partial firing by coal gas and hot producer gas. In this way, coke production could readily be increased when necessary.

Other work has been done by the Fuel Research Board on the firing of horizontal retort settings by coal gas and on the firing of narrow retorts on low-temperature carbonization by coal gas.[3, 4, 5]

II.

The Partial Dehydration of Gas by the "Glycerin" Gas Drying Process.

At the present time there are four plants at work on the partial dehydration of gas by the "Glycerin" gas drying process in this country. These are situated at Colwyn Bay, Ilkeston, Burton-on-Trent, and Luton. Of these, the Luton plant is the largest. A description of the Luton plant and some working results were published in the "GAS JOURNAL" for March 28, 1934.

A further brief summary of results obtained up to the present time on this plant may be of interest. The satisfactory working of the plant previously recorded has since been fully maintained. Since Jan. 7, 1935, continuous tests have been made of the dew point of the gas leaving the works. The tests were made by the weighed calcium chloride U-tube method, the U tubes being taken off, weighed, and renewed three times monthly. The continuity of the record was interrupted on several occasions by accidental breakage of the U-tubes. The results obtained were:

Average Dew Point of Gas Leaving the Works.

Date.	Dew Pt., °F.	Date.	Dew Pt., °F	Date	Dew Pt., °F.
1935.		1935.		1936.	
Jan. 7–14	32	June 1–11	49	Dec. 20–Jan. 1	30·5
,, 14–28	..	,, 11–20	46·5	Jan. 1–10	26
,, 28–		,, 24–30	58	,, 10–20	31·5
Feb. 4	38	,, 30–July 1	..	,, 20–31	..
,, 4–11	36	July 1–20	57	,, 31–Feb. 11	31
,, 11–18	..	,, 20–Aug. 1	57·5	Feb. 11–20	26
,, 18–28	36·5	Aug. 1–10	59	,, 20–29	32
,, 28–		,, 10–20	..	,, 29–Mar. 10	28
Mar. 11	34	,, 20–Sept. 1	53	Mar. 10–20	37
,, 11–20	39·5	Sept 1–13	46	,, 20–April 2	43
,, 20–		,, 13–20	51·5	April 2–11	34
April 1	46	,, 20–Oct. 1	48	,, 11–21	35
,, 1–10	38	Oct. 1–10	46	,, 21–30	41·5
,, 10–20	41	,, 10 20	41	,, 30–May 12	43
,, 20–30	41	,, 20–Nov. 1	39	May 12–21	48
,, 30–		Nov. 1–11	37·5	,, 21–June 2	47
May 14	45	,, 11–20	36	June 2–10	45
,, 14–27	42	,, 20–Dec. 2	34	,, 10–20	49
,, 27–		Dec. 2–11	30	,, 20–30	54
June 1	50·5	,, 11–20	30	,, 30–July 9	50
				July 9–23	53
				,, 23–31	..
				,, 31–Aug. 11	..
				Aug. 11–20	40
				,, 20–Sept. 1	39

The results obtained during the three summer months would have been improved upon if it had been possible to provide the plant with an adequate supply of reasonably low temperature cooling water. In summer the cooling water frequently reaches a temperature of 68° F.

The Results Obtained on the District.—The results obtained throughout the year on the district have been highly satisfactory. Whereas before the installation of the plant the service stoppages investigated and found to be due to the presence of water numbered two or three hundred per month, in recent years the number has been: 1934, 30; 1935, 17; January-June, 1936, 2. Moreover, since the plant was put to work, the number of consumers connected to the Company's mains has increased considerably; on Dec. 31, 1932, it was 21,155; on June 30, 1936, it was 27,787. No trouble has been experienced with dry rust in services and appliances.

The total water pumped from the mains syphons in 1935 was 288 gallons, and in January-June, 1936, was 149 gallons. The gas sold per annum is approximately 1,000 million cu.ft., and the total mileage of mains is approximately 128 miles. Both before and since installing the gas drying plant no trouble has been experienced on the district with gum. No washing for benzole takes place on the works.

The Working of the Plant.—The general working of the gas drying plant has been extremely satisfactory and has presented no difficulty. The only routine attention which the plant requires in addition to the daily re-concentration of weak glycerin is occasional cleaning of the jet condenser in the vacuum evaporator. Owing to the use of hard water, a chalk deposit forms which is removed every ten days or so. This is, however, a straightforward job which is easily done.

With the exception of the tubular pan in the evaporator, the plant has been entirely free from corrosion troubles. Some corrosion of the copper tubes in the tubular pan in the evaporator has been experienced. This pan is the boiling chamber in the evaporator. The first failure occurred after 21 months' work, when a hole was found in one of the copper tubes. This tube was replaced, but soon afterwards other tubes failed. A new tubular pan was purchased at a cost of £54, and was fitted in the evaporator; the old pan was retubed and is kept as a spare. The new pan has been in operation for 15 months and so far there has been no sign of trouble.

The colour of the glycerin when supplied to the plant is a clear golden brown. Its colour in the plant becomes almost black. This colour has been found to be due to the presence of finely divided solid matter which is suspended in the glycerin. When this suspension is removed by filtration, the glycerin resumes its former golden brown colour. In the re-concentrated glycerin of 58° to 60° Twaddell strength, it remains in suspension; in the weak

glycerin of 52° to 54° Twaddell it has a tendency to settle out slowly. Consequently there has been an accumulation of it in the weak glycerin tank, into which the glycerin flows after passage through the plant. On June 22, 1936, the weak glycerin tank was emptied and cleaned out of sludge for the first time since the plant was started in November, 1932. There was about 4 in. of black sludge in the tank, the area of which is 16 sq.ft. The sludge was easily removed by a scoop and was like a black paste. No other part of the plant has been cleaned from sludge. Its presence has given no trouble whatever.

The makers of the plant, Messrs. Kirkham, Hulett & Chandler, had an analysis made of a sample of the sludge removed from the weak glycerin tank in June, 1936. The following is a summary of the analysis:

The dry matter in the sludge was 21·5% of the sample, the remainder being an aqueous solution of glycerin in which sodium chloride and a little sulphate were present. The composition of the dry sludge was as follows:

Organic matter, soluble in CS_2	1·83%	
Soluble in acetone	1·73 ,,	
Balance of organic matter, at least	4·51 ,,	
Total organic matter, at least		8·10%
Prussian Blue, not more than	16·0 %	$\frac{8\cdot10\%}{24\cdot10\%}$ = 10·45% of Fe_2O_3
Free Fe_2O_3 including some FeO at least	56·55 ,,	= 56·55 ,, ,,
CuO, MgO, CaO (difference figure)	2·1 ,,	
Combined water and undetermined (by diff.)	17·25 ,,	67·0% ,,
	100·00%	

The sludge is apparently mainly derived from dust carried forward by the gas into the dehydration plant from the purifiers. There is little gummy or tarry matter present. The copper is derived from the glycerin evaporator.

The consumption of glycerin.—The amount of glycerin required to replace losses has been found to be less than was at first reported. The losses appear to be decreasing. The glycerin replacements and costs and the gas treated have been as follows:

Year.	Glycerin Added to Plant. Tons.	Cost of Glycerin.	Gas Treated. Thous. Cu.Ft.
1933	3	3 at £27·5 = £82 5s.	878,408
1934	3	3 ,, £33 = £99	932,314
1935	2	2 ,, £38 = £76	1,004,168
1936 to Aug. 31	1·5	1·5 ,, £38 = £57	704,509
Totals	9·5	£314 5s.	3,519,399

The glycerin losses have thus averaged over the whole period 2·7 tons per 1,000 million cu.ft. treated, at a cost of £89·35. This works out at a cost of 0·021d. per 1,000 cu.ft. (4·9 therms) or 0·0044d. per therm of gas treated. During the last 20 months the glycerin replacements have been approximately 2 tons per 1,000 million cu.ft. treated, at a cost of £76—*i.e.*, 0·017d. per 1,000 cu.ft.

Our experience with this plant enables us to state that the "Glycerin" gas dehydration process is a thoroughly sound technical and commercial proposition.

REFERENCES.

[1] "The Solid Products of the Carbonization of Coal." The South Metropolitan Gas Company.

[2] From the Metropolitan and Suburban Companies' Results in 1935. Compiled by Mr. F. J. Bradfield—The "GAS JOURNAL," March 11, 1936.

[3] Fuel Research Technical Paper No. 38. "Design of a Coal Gas Induction Burner for a Horizontal Retort Setting."

[4] Report of the Fuel Research Board for the year ended March 31, 1930.

[5] Fuel Research Technical Paper No. 35. "Low Temperature Carbonization. Narrow Brick Retorts at the Fuel Research Station."

[6] "The 'Glycerin' Gas Dehydration Process. Experiences at Luton Gas Works." By A. F. H. Knowles and Roy Summerson—"GAS JOURNAL," March 28, 1934.

Vote of Thanks.

In proposing a very hearty vote of thanks to Mr. Summerson, Mr. R. N. LEFEVRE, Senior Vice-President, quoted "the King can do no wrong," and he suggested that the same applied to the President of their Association so far as his Presidential Address was concerned. Therefore, it was not their custom to discuss presidential addresses. But he was sure that they would not like to disperse without according a hearty vote of thanks to Mr. Summerson. He paid tribute to his enthusiasm, observing how from his Address it was apparent that Mr. Summerson carried his investigations to his home. He thought that the Address was unique in that the President had catered for the interests of all members, both those engaged in manufacture and those whose work lay on the distributing side. He had much pleasure in asking them to accord a hearty vote of thanks to their President.

Mr. S. S. WALDOCK, Gas Light and Coke Company, Junior Vice-President, said he had much pleasure in seconding the vote of thanks so ably proposed by Mr. LeFevre. The President's Address had a threefold aspect, for it dealt in turn with coke—a great subject, and the two others—wet and dry—water softening and gas drying plant. He had studied the Address very carefully. The firing of retorts either partially or wholly by gas with a view to increasing coke production was a subject that merited great attention for it was only by careful planning of such plant on flexible lines that the desired result could be achieved. He had much pleasure in seconding the vote.

The PRESIDENT briefly replied, thanking the members very much indeed. He had tried to make his Address of interest to them all, and he only hoped that he had been successful.

The Milbourne Medal.

The PRESIDENT then made an announcement concerning the Milbourne Medal. It was usual at their opening meeting to present the Milbourne Silver Medal for the best Paper read during the previous session by a member of the Association.

Last session two Papers had been read by members. The Author of one of these Papers would not allow his contribution to be considered for the medal award, and this left them with only one Paper for consideration for the medal award.

The Council had very carefully considered the unusual situation that was so occasioned, and, after consultation with Mr. Milbourne, the donor, had decided that there should be no award this year.

Ten Years Old

Western Juniors at Bristol

The Opening Meeting of the Western Junior Gas Association was held on Oct. 17 at the Stapleton Road Works of the Bristol Gas Company. The occasion coincided with the tenth anniversary of the formation of the Association. Some sixty members attended, and made a tour of the works.

This station has a maximum output of 8 million cu.ft. per diem, the gas delivered being straight coal gas. A feature of interest to the visitors was the Woodall-Duckham continuous vertical retort installation; this plant having a capacity of 3 million cu.ft. per diem was only recently completed and is now under slow fire. Another feature, of added interest since the members recalled the technical details in a Paper by Mr. T. W. Clapham last session, was the coke cutting, grading, and storing plant.

After the tour members made their way to the Head Offices of the Company, where tea was served through the hospitality of the Chairman and Directors of the Bristol Gas Company. Members were welcomed by Mr. Sydney Smith, Assistant to the Chief Engineer.

The PRESIDENT (Mr. S. B. Jones, Clevedon) expressed the thanks of the Association which was again indebted to the Bristol Company for support. He explained that this was the tenth anniversary of the formation of the Association, and that, after the Inaugural Meeting at Bath, the first meeting of the Association was held at Bristol. He further mentioned that the continued success of the Association was due largely to the support of senior members of the Industry in the West of England and the directors of undertakings.

In ten years the membership had doubled itself. He expressed the congratulations of the Association to Mr. R. Robertson on his election as Junior Vice-President of The Institution of Gas Engineers, and the hope that he would have very enjoyable years of office up to and including the presidential year. The motion of thanks to the Company was supported by Mr. J. E. ACKROYD (Swindon, G.W.R.), Senior Vice-President.

In opening the business meeting the PRESIDENT presented to Mr. J. H. Dyde, the immediate Past-President, a certificate for his year of office and congratulated him on his recent appointment of Assistant to the General Manager of the North Middlesex Gas Company.

Mr. DYDE suitably replied.

SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT)

Opening Meeting held at Glasgow, Oct. 10, 1936.

THE PRESIDENT.

Mr. John Webster is Assistant Gas Engineer to the Port Glasgow Gas Department. He holds the Diploma of The Institution of Gas Engineers in Gas Engineering and the Junior Certificate of the Royal Technical College, Glasgow, in Mechanical Engineering, together with Final Certificates in Gas Manufacture and Supply of the City and Guilds of London Institute.

The Opening Meeting of the Scottish Junior Gas Association (Western District) was held in the Royal Technical College, Glasgow, on Saturday, Oct. 10, 1936, Mr. ALEXANDER BUJNOWSKI presiding.

Presidential Address

OF

JOHN WEBSTER, of Port Glasgow

Financial efficiency is the yardstick by which all aspects of our work must ultimately be measured, higher thermal or chemical efficiency does not presuppose better financial results, while high consumption per consumer may be secured at too high a price. Decrying research would be the last thing of which I would be guilty, but unless the ultimate result is to give cheaper service to the consumer, or give increased service for the same cost, then its prosecution will not be to the benefit of the Industry.

For the purpose of illustration I have taken the accounts of a hypothetical Scottish municipally owned gas undertaking for the year ended May 15, 1936, the sale of 100 million cu.ft. of gas per annum being assumed.

Estimate of Revenue and Expenditure.

In all cases municipal accounts commence as from May 15; and about the end of July, after the coal contracts for the year have been settled, an estimate of income and expenditure for the financial year is prepared. After consideration of this estimate, the town council fixes the gas rates to be levied during that year.

(1) Revenue Account.

This is really the statement of the income and expenditure pertaining to the actual business of making and selling gas and may be more conveniently considered under sub-headings:

(a) Expenditure on Works.

The main items under this heading are cost of coal, wages of stokers and labourers, technical staff on works, cost of purifying material, cost of materials for works maintenance, administrative expenses, such as printing, stationery, &c., also proportion of manager's salary. In such a works as we are considering the following might be a typical summary:

Coal (17s. 9d. per ton)	£3,760
Wages	2,300
Other expenses	1,440
	£7,500

From this it will be seen that expenditure on coal accounts for 50% of the total, and an increase in the price of coal by 2s. per ton is equivalent to 1d. extra per 1,000 cu.ft., or 0·25d. per therm.

Although revenue and expenditure should not be mixed, it is more convenient at this point to consider:

(b) Income from Residuals.

The items here are revenue from sale of coke, tar, ammonia products, also spent oxide and scrap material, say, £2,500.

Net Cost into Holder.*

By deducting the income (*b*) from the expenditure (*a*) we arrive at the net cost of gas into holder; in this case

(*a*) Expenditure on works	£7,500	
(*b*) Income from residuals	2,500	
		£5,000

The next sub-heading is:

(c) Expenditure on Distribution of Gas.

Under this heading are included wages expended and materials used on the repair and maintenance of mains and services, repair of meters, wages of gasfitters on complaints, and cost of gas stove repairs. The expenditure on all new work is dealt with under capital account. Expenditure, say, £2,917.

(d) Revenue from Distribution Department.

This is mainly derived from revenue from showroom, value of work done for private parties (sometimes called chargeable gasfitting), and rental of gas cookers, say, £833.

Net Cost of Distribution.*

The net cost of distribution is arrived at by deducting (*d*) from (*c*) thus:

(*c*) Expenditure on distribution	£2,917	
(*d*) Income from distribution	833	
		£2,084

Net Cost of Gas to Consumer's Meter.*

This amount is obtained by adding the net cost into holder to the net cost of distribution, giving in this case £7,084.

(e) Expenditure on Burgh Rates and Taxes.

The procedure when computing the valuation of an undertaking for assessment purposes is perhaps the most debatable point in gas-works finance, but by working out an average case the causes of high valuation and therefore greater expenditure on burgh rates should be clear.

Gas Works Valuation, 1935-36.

Accounts to May 15, 1935 (previous financial year).

Revenue				£16,666 0 0
Expenditure, *less* interest and sinking fund		£12 915		
Less insurance	£20 0 0			
Less feu duties and wayleaves	20 0 0			
Less proprietors' assessments	500 0 0			
Less loan charges	9 0 0			
		549	12 366 0 0	
			£4,300 0 0	
Less bank overdraft interest (if any)			..	
Tenant's capital—				
One-half working expenses (1935)	£5,900 0 0			
4,000 meters at 40s.	8,000 0 0			
Cookers at cost	7,000 0 0			
Tools, barrows, &c.	1,100 0 0			
	£22,000 0 0 at 5%		£1,100 0 0	
			£3,200 0 0	

Year 1931-32	£3,200
,, 1932-33	3,125
,, 1933-34	3,000
,, 1934-35	3,100
,, 1935-36	3,200
	5)15.625
	£3,125
Less 20%	625
Valuation for year 1935-36	£2,500

If burgh rates are taken at 10s. per £ of valuation, the total burgh rates payable would be £2,500 at 10s. per £....£1,250.

It will be noted that the dominant influence in the foregoing calculation is the amount of interest and sinking fund payable

(f) Revenue from Sales of Gas.

There is not much to remark under this heading so far as accountancy goes, but it is a most important matter, and its expansion by means of increased sales demands the utmost attention. Increased sales, at the fixed price of gas, with only the net cost of gas into holder as a debit,

* These calculations do not take place in the accounts proper, but are most conveniently dealt with at this point.

is one sure way of creating a large net profit and ensuring a reduction in the price of gas during the following year. Assuming the sales of gas to be in the following ratio, the revenue from sales of gas would be:

	Cu.Ft.	Per 1,000 Cu.Ft. s. d.
Domestic consumers (ordinary)	35,000,000 at	2 7
,, ,, (p.p.)	43,000,000 ,,	2 10
Industrial ,, ...	10,000,000 ,,	2 0
Public lighting	12,000,000	
Total sales of gas . . .	100,000,000 ,,	2 8 = £13,333

(2) Interest and Sinking Fund.

When a Town Council receives a Provisional Order or Special Act of Parliament to carry on the business of gas manufacture, &c., through the Scottish Office in the case of Scottish undertakings, it is authorized to raise money to meet the capital cost of works and cost of laying mains, &c. Certain safeguards are imposed, and when during the course of the years the old loans are paid off and fresh capital expenditure is necessary, fresh application is made to the Scottish Office, this being granted if the Auditors' Report is satisfactory. The maximum amount to be borrowed is always stated, as is also the period of loan, and sometimes the rate of interest to be paid. A fund called the Sinking Fund is stipulated, by which it is possible to repay the loans at the end of the period of loan, and this is accomplished by taking from the gross profit a sum equivalent to the total borrowings, divided by the loan period. Taking £43,770 as the amount on loan from bond holders, repayable in 30 years, then a sum of £1,459 is the instalment of loans necessary every year.

Interest must be paid on the sums of money on loan, and assuming a rate of interest of 3½% per annum on the amounts on loan, then a further sum of £1,459 must be taken from gross profit and paid annually to the bond holders. The addition of these two charges gives: Instalment of loans and interest, £2,918.

(3) Depreciation Fund.

Meters and cookers, not having a useful life of 30 years, fall to be renewed before the sum borrowed for their purchase has been repaid, so in order to compensate for this the capital cost of meters and cookers is paid off at a rate more in keeping with their useful life, 10% per annum for cookers and 6% per annum for meters being a usual rate. This amount also is a charge against gross profit:

Capital cost of cookers, £2,720 at 10% . . = £272
Capital cost of meters, £2,400 at 6% . . = £144

Depreciation fund contribution. . . £416 per annum

(4) Reserve Fund.

Certain heavy expenditure, such as rebuilding retort settings or other gas-works plant, if charged to revenue in one year, might cause a serious loss on the net revenue account and perhaps necessitate increasing the price of gas. This possibility is, however, guarded against by the creation of a reserve fund.

The interest and, if necessary, the accumulated amount of the fund is available for the purpose of meeting such extraordinary repairs expenditure. A maximum is fixed for this fund, but the fund can be utilized, if necessary, to make good deficiencies in the net revenue account, and so obviate the rise in the price of gas due to a temporary increase in expenditure, say, due to a coal stoppage. A usual amount sanctioned is 1d. per 1,000 cu.ft. or its equivalent per therm, and in this case the contribution is derived thus: 100,000,000 at 1d. per 1,000 cu.ft. = £416, and this appropriation from the gross profit is placed to the credit of the reserve fund.

(5) Income-Tax.

Tax payable on the profit made during the previous year's trading is levied by the Inland Revenue during the year, and the sums collected go into national funds.

Computation of Profits on Public Supplies.

[Gas Undertaking—General Rate Fund.]

Expenditure.		Income.	
Manufacture. . .	£7,500	Sales of gas	£13,333
Distribution . . .	2,918	Residuals.	3,333
Other expenditure, *less* sinking fund and interest . .	2,497		
	£12,915		£16,666
Profit	£3,751		
Less allowance of 1-10th and wear and tear allowance (works maintenance) . .	1,000		
Valuation for income-tax. .	£2,751		
£2,751 at 4s. 6d. per £ =	£619		
Less retained £914 at 4s. 6d. per £ . . . . . =	203		
Income-tax actually paid. .	£416		

The basis of this tax is the sum paid to the sinking fund and interest, less an allowance for repairs and renewals of works and mains and services. Being a municipal undertaking, however, tax is not paid on the full valuation for assessment, as there are other corporation accounts which have sinking funds not ranking for income-tax assessment; these are allowed to be deducted from the valuation of the gas department, and by this means part of the rates and taxes paid are recovered.

Abstract of Net Revenue Account.

Having now examined the different accounts which are necessary, the next step is to tabulate them in order to find the relative bearing on the price of gas.

—	Total.	Per 1,000 Cu.Ft	Per Therm.
	£	s. d.	d.
Revenue account—			
Cost of gas into holder .	5,000	1 0	3·0
Cost of distribution . .	2,084	0 5	1·25
Rates and taxes. . . .	1,250	0 3	0·75
Interest and sinking fund .	2,918	0 7	1·75
Depreciation fund. . . .	416	0 1	0·25
Reserve fund	416	0 1	0·25
Income-tax	416	0 1	0·25
Net cost of gas . .	£12,500	2 6	7·50
Net profit . . .	833	0 2	0·50
Revenue from sales of gas .	£13,333	2 8	8·00

Statistics as to Gas Manufacture.

Year ended May 15, 1936.

Gas Made.		Gas Sold.		Declared Calorific Value.	Coal Used.
Cu.Ft.	Therms.	Cu.Ft.	Therms.		
107,500,000	430,000	100,000,000	400,000	400 B.Th.U.	4,300 tons

The above figures are assumed for the purpose of calculation.

By dividing the various totals by the number of 1,000 cu.ft. of gas *sold* or by the number of therms *sold* the figures under the appropriate columns are obtained. Cost per 1,000 cu.ft. or per therm of gas made is only of service in the matter of works control.

Uncontrollable Expenditure.

The low selling price of gas enjoyed by some undertakings can almost always be traced to wise financial planning in the past. By the building up of an ample reserve fund it is possible to utilize it later for the purpose of capital expenditure, thus keeping within bounds sinking fund and other charges.

A selling price of 8s. per 1,000 has not been unknown, even although the cost to consumer's meter was 1s. 6d. to 2s. per 1,000 cu.ft., and therefore comparison of the management of one undertaking with that of another, on the basis of selling price of gas, is most unfair, although it is an oft recurring subject in "Letters to the Editor."

Assuming that instead of the outstanding loans being £43,770 in the case used for illustration they were double this figure (£87,540), then the increased charges to be borne by the consumers would be:

—	Per 1,000 Cu.Ft.	Per Therm.
	d.	d.
Interest and sinking fund	7	1·75
Burgh rates	3·15	0·78
Income-tax	1·10	0·28
A total increase of	11·25	2·81

This increase would necessitate the raising of the average revenue from gas sales to 3s. 7·25d. per 1,000 cu.ft. (10·81d. per therm) despite the fact that the cost to consumers had not been increased. Under a flat rate system of charging, all consumers would have to pay the increase equally, and an increase of this magnitude might result in industrial consumers changing over to other fuels.

No one will deny that the adoption of correctly computed preferential rates has greatly benefited the Gas Industry, and there is no reason why this subject should not exercise the minds of the juniors.

Controllable Expenditure.

As remarked earlier in this Address, financial efficiency is one of the yardsticks by which a gas undertaking must be measured; the other is the service it provides to the consumers. Those undertakings producing and distributing gas at the lowest rates per therm are those deriving the highest commercial benefit from residuals, &c., while at the same time maintaining a low working cost. Testimony to many efforts to increase efficiency of works plant and the conduct of distribution affairs with the utmost economy is contained in the Transactions of our own and other gas associations. There is one matter, however, that demands attention at this point, and that is standard calorific value. Many factors enter into the correct administration of controllable expenditure, but the most important would appear to be:

(1) Type of population within area of supply.
(2) Type of industry carried on in area.
(3) Geographical position.

The first two factors vary from town to town and have a dominating influence on the working of an undertaking. Therefore, divergent policies must be adopted even in towns situated close to one another, and this policy must always be viewed against its local background. The adoption of a standard calorific value would standardize policy, to the detriment of financial efficiency, and would appear to be an attempt to bend the tree by binding it to a twig. The mere fact that a consumer who removes to another town could be sure of obtaining a similar quality of gas for his apparatus would not compensate him for having to pay, say, twice as much per therm. The actual volume of gas delivered need not worry a consumer unduly in towns having a reliable consumer service. If standard calorific value is a necessity, then a standard price is even more necessary.

In the matter of sales of appliances, in relation to costs, it is obvious that the greater the number of gas consuming appliances in use, the greater the potential revenue to the undertaking, and as little or no capital expenditure is necessary when apparatus is installed on sale outright or hire purchase, the only debit against extra revenue is the cost of gas to consumer's meter, this extra profit being available for price reduction, preferably to those who consume more gas. Where free apparatus is provided, care must be exercised that capital expenditure is limited to a fixed sum per annum, otherwise all consumers will be unduly burdened, as previously explained.

Discussion.

Mr. McLAREN (Newton-on-Ayr) referred to the Address as an out-of-the-ordinary yet extremely useful one. He said that the all-important question was rating. The difference in the Scottish and English ratings was worthy of full consideration. Variation in calorific values was capable of adjustment. He stressed the fact that the management could only control part of the expenditure as the remainder was fixed and outwith the normal control.

Mr. E. SMITH (Dumbarton) stated that the Address filled a very important gap and would be very useful for reference by juniors. In his opinion the price per therm was the all-important factor. The vision of the controlling authority effected a very large influence on the capital charges. He referred to tariffs, and the search for the ideal one. So many factors affected the application of any one that it might only be effective and economic for a comparatively short time.

Mr. BATEMAN (Kilmarnock) indicated that to one engaged solely on the manufacture or works side the Paper was invaluable. He asked the effect of long term loans. He instanced a case where a loan for a specific purpose was still outstanding long after the plant was out of commission. He suggested that a period of thirty years should be the limit.

Mr. WEBSTER, replying, thanked the members for the reception of the Paper. The Address, he said, had been condensed, which perhaps made it less clear in parts. The reason he had selected such a subject was that he had experience of a works which had been heavily capitalized and he had wished to show the effect of such a condition on the price of gas. Comparatively little had been written on this subject and he appreciated that the Education Scheme now included a section devoted to the financial aspect. Economic control was very important, particularly so as was shown when only 50% of the expenditure was controllable. He was surprised that no one had taken up the suggestion of universal calorific value for Britain. The search for the perfect tariff still continued, and it might be possible that a junior might effect some very useful scheme.

On the motion of the CHAIRMAN the new President was very warmly thanked for his Address, and the best wishes of the members for a successful year of office were conveyed to him.

WALES AND MONMOUTHSHIRE

The opening Meeting of the Association was held at Swansea on Saturday, Oct. 10.

JUNIOR GAS ASSOCIATION

Presidential Address

OF

J. H. CHAPMAN, of Swansea

This Industry, of which I feel sure we are all proud, having served man faithfully for so many years, is like many other industries, in that it not only endeavours to keep pace with the times, but is constantly, also, anticipating modern and future requirements. This may appear to be merely a matter of endeavour, enterprise, and vision, but it has to be remembered that there are other factors which have a very considerable bearing and influence on the results of our efforts.

The ample return in the past on the capital invested in the Industry has drawn attention to the fact that there is a general demand by the public for light, heat, and power, or it might be said that they have been found to be public necessities. The result, as we all know, is that we are faced with competition, not from one, but from two or three rivals, each feeling capable of supplying the public with those commodities which formerly were supplied principally by the Gas Industry.

The efforts of our competitors are neither limited nor spasmodic, but are backed by unlimited capital, government support, intensive advertising, and scientific brains. Briefly, that is what faces us to-day. I know, of course, that this state of affairs is common to many industries; but it is at times advisable just to realize where we stand and what we are up against.

It is to the Junior Gas Associations throughout the country that the chiefs of the Industry are looking for modern ideas, enterprise, and loyal service, to meet this competition. A fortnight ago I had the pleasure of attending the Joint Council Meeting of the Junior Associations, held at Glasgow, and, judging by the enthusiasm shown at that meeting, I do not think we shall let the Industry down. It is no good resting on our oars, however, for continuous effort is necessary if we are to keep abreast of our rivals, or better still, keep at least a pace ahead of them.

I propose to confine my remarks to-day to what is generally known as the distribution side. In doing this, I realize that manufacture is equally as important as distribution; but as both require studying from entirely different points of view, I feel that both subjects could not adequately be covered in a short address of this description.

"Delivering the Goods."

Without professing to be a student of English, I believe a correct interpretation of the word "distribution" could be "delivering the goods." Our object in studying the subject must, therefore, be a desire to learn how delivery may best be effected, with a view to satisfying the consumer and ensuring the continuance of his custom. Assuming my interpretation to be correct, I feel sure you will all agree that distribution should be studied not only by executive chiefs and others occupying important positions, but by everyone employed in the Industry —even by the office boy.

The adequate supply of gas through mains and services is, in itself, a problem sufficient for any Gas Engineer, and one which to-day requires considerable thought and foresight. The development of most towns is now controlled by town planning schemes, whereby the number of houses to the acre is limited, and adequate grounds and open spaces are invariably provided, resulting in longer lengths of main and service to supply the consumer. Slum clearance calls for existing services to be cut off at the main, and frequently, heavy costs are incurred in reinstating the road surface which often has to be disturbed. You will see, therefore, that while town planning is desirable if the growth of the town is to proceed on proper lines, the institution of such schemes adds to the already heavy capital expenditure and maintenance costs which gas undertakings have to bear, for not only are we called upon to cut off and abandon mains and services in one part of the town, but are required, also, to lay mains and services in another part of the district, to supply the same consumer.

These factors in themselves present sufficient difficulties, but, in addition, there is the problem of maintaining adequate pressure on the new estates, rendered all the more difficult owing to the frictional losses in the long lengths of main from the supply station, and necessitating larger trunk mains or high-pressure feeder mains. This necessity oftentimes proves to be an expensive item, without, however, showing any increase in the number of consumers or in the output of gas.

In Swansea, many schemes have been prepared, much information relative to pressures has been tabulated, and considerable time and trouble have been taken, in order that we may have before us reliable information on which to base our future requirements, corresponding with the anticipated development of the town. The question of services into consumers' premises has, during recent years, received considerable more attention than was devoted to it formerly, for experience has taught the necessity of running services of adequate size, to minimize the trouble caused by corrosion, frequent relaying, and repeated reinstatement costs.

Referring to the question of relaying, it has been suggested that copper tubes should be pushed through old service pipes, so as to avoid the expense and time involved in excavating and reinstating the ground. This may be an excellent expedient or subterfuge economically to overcome a difficulty, but it has to be remembered that this results in a decrease in the diameter of the service, which might be a retrograde step. The use of instantaneous water heaters which, although used only intermittently and for short periods, have a high gas consumption, and consequently require a large service, might be used as an argument against the use of copper tubes in the manner suggested; and is it not a universally accepted modern practice to increase rather than decrease the size of the service pipe?

Complete Carcassing.

The complete carcassing of houses is a practice not now often followed, because unless gas fires are fitted in the majority of the bedrooms, it is unnecessary to do so. Frequently, the supply of gas is confined to two or three rooms, and if points are run to each of these, the purpose is served. The fact that modern houses are not completely carcassed does not, however, mean a decrease in consumption, since it will readily be appreciated that a house fitted with a cooker and water heater will invariably consume far more gas than would be consumed in a house completely equipped, but using, say, a gas fire only.

In discussing the question of the water heating load, there is one point which is of vital importance to the Industry. With the exception of water heaters, domestic gas appliances are of comparatively simple design, are easy to clean and adjust, and, as the mechanism is readily understood by the consumer, are safe in the hands of a novice. With water heaters, however, and particularly with instantaneous heaters, the mechanism is of a more elaborate nature, and becomes more of a precision instrument. Consequently, the consumer can hardly be expected to understand its functioning, which points clearly to the necessity of ensuring that the appliance is safe and foolproof under all conditions, even after a lengthy period of service. It is essential, therefore, that every Gas Engineer should assure himself that each instrument of this nature which he may intend to supply, meets his requirements, and before offering it to the public he should test it under heavy local working conditions.

There is just one other point which I would like to mention: I refer to the necessity of fitters being thoroughly acquainted with the mechanism and construction of the appliance. It is useless handing to a fitter a complicated piece of apparatus unless he thoroughly understands it; and every fitter called upon to effect the fixing of water heaters should be given the opportunity to secure a thorough knowledge of them, to know exactly how they work, and should, also, be kept informed of any improvements. I am confident that our fitters are fully capable of absorbing this knowledge, but I mention the point because they cannot be expected to know all there is to know about the numerous types of water heaters now marketed unless they be given the necessary facilities.

Maintenance.

Maintenance is a subject of considerable importance. Gas undertakings have given consideration to this question, and many have in operation a scheme covering some of their consumers and part of their apparatus. This does not, however, fully meet the case, and the construction of modern gas consuming appliances and the exacting requirements of the consumer, warrant a maintenance scheme of a nature much more comprehensive than that now in force. To illustrate my point, let us take the question of maintenance of water heaters—either geysers, storage, sink, or multi-point. Would anyone suggest that it is sufficient merely to fit the heater, and afterwards expect it to function satisfactorily, for an indefinite period? No one, not even anyone with only the faintest knowledge of the construction of the machine, could expect proper service from mechanism of this character, unless it is subject to regular maintenance.

Personally, I should like to see in operation a maintenance scheme whereby it would be possible to arrange for the inspection and maintenance of every piece of gas apparatus at intervals not exceeding six months. I know this is asking much, but remembering the intensive competition we are to-day called upon to meet, we must be perfectly satisfied that each piece of apparatus is working correctly and economically, for this gives the consumer the satisfaction at which we should all aim, and fortifies our hold against the seemingly attractive offers of salesmen and canvassers representing our competitors.

At Swansea, we have in operation a scheme whereby every piece of hot water apparatus is examined at least every six months. Reports received from fitters make interesting reading, and prove that, in putting the scheme into operation, we acted wisely.

Canvassing is a subject which continues to receive more time and attention than ever before, yet, in my opinion, it is a matter which requires even closer examination than it now receives. Some undertakings combine the duties of canvassing and maintenance under the same personnel, but I believe the time is coming when canvassing will have to be performed by a staff entirely separate from fitters or maintenance men.

To-day, the number of consumers who regularly visit the showrooms consist of a small proportion of the total, while meter readers and collectors are the only representatives who have the opportunity of calling upon every customer. There is no doubt that the contact they establish assists them greatly in interesting the householder in further appliances, but the very nature of their duties prevents them giving the time and attention which could be given by a speciality canvasser. I should like to see the district divided into certain areas or sections, and a scheme devised whereby consumers in each section would be called upon by a canvasser at least every twelve months. Each canvasser, by maintaining his own area, would in time become well known, and by approaching the consumer in a personal and friendly manner, he would be the means of forming between the consumer and the undertaking that link of friendship and understanding which indicates the march of progress. When we receive correspondence requesting that "Mr. Smith" or "Mr. Jones" should call, it gives us confidence in our efforts, for it implies that a personal contact has been established, and that half the battle has already been won.

The price of gas is to-day a subject much in the public eye. Many and varied are the differential scales which have been devised, and no doubt there are good reasons for the change. It is not my desire to say much about the subject, because this is a matter which hardly comes under our jurisdiction. When the price of gas is raised to any section of the public, however, that section feels that it is being unjustly treated, and despite all the arguments put forward, it is hard to convince some consumers that the basis of charge is equitable. However necessary these revised scales may be, therefore, it must be remembered that the public is a severe and perhaps, for want of appreciation of the facts, an unjust critic, and interesting them in further appliances becomes increasingly difficult.

COKE OVEN MANAGERS' ASSOCIATION

Presidential Address

OF

THOMAS JOHNSON, B.Sc.

Presented at the Annual Meeting of the Association held at the Hotel Victoria, London, on Thursday, Oct. 22, 1936.

In the first place, let me thank you for the honour you have done me in electing me your President for the forthcoming year, an honour which I the more appreciate seeing that this is the twenty-first anniversary of the formation of our Association.

At the same time I feel that this year I shall have great difficulty in giving to the duties of office the time and attention so important a position calls for, since during the year the first and foremost call upon my time will be that in connection with the operation of a new plant carbonizing 20,000 tons of coal per week, and upon the smooth running of which plant largely depends the successful operation of a very important iron and steel works in Middlesbrough.

When I agreed to take office, a little over a year ago, we were preparing to start up a new plant in Cardiff, which plant I considered would be running smoothly by the time I occupied the chair, but since then, like the parson, I have been fortunate in receiving an important call back to the north, and at the moment am, and for the greater part of the year shall be, very much occupied dealing with the teething troubles associated with the first year of operation of new plant. In all these circumstances, therefore, I crave a little indulgence and trust that while I shall do all in my power to carry out my duties to the full and maintain the excellent standard set by my predecessors, you will have patience if I am unable always to attend meetings when called upon to do so. Our immediate Past-President, however, has a wonderful record for devotion to duty both as Secretary and President, and I am very sure that he will do all in his power to make up for my possible shortcomings.

The advancement in the art of coke-making from the earliest stages to the present has been very well recorded in our publication "The History of Coke Making and The Coke Oven Managers' Association," but to my mind more progress in the art has been made during the last twenty-one years than in all the previous years put together. When one considers the conditions obtaining twenty-one years ago, and compares them with the position to-day, one is almost staggered at the progress made and wonders what our successors will be doing twenty-one years hence.

Twenty-one years ago many of us found ourselves in charge of plants built by contractors at their own expense on the basis that the colliery company or iron masters, as the case may be, provided the coal for carbonization from which they received the coke made free of charge and the contractor received for his (expenditure and experience) the whole of the by-products, the contractor handing over to the company at the end of about seven years the coke and by-product plant more or less worn out. Such plants did make coke and by-products, but the quality of the coke and by-products therefrom were more a matter of luck than of management since, at that time, little was known about the blending of coals and the control of the quantity and quality of by-products produced during carbonization.

Coke Research Committees.

Very valuable work has been done by our Coke Research Committees in recent years on the effect of crushing, blending, and temperature upon the quality of coke produced, and the practice of mixing back finely crushed coke breeze with the coal blend where practicable has been a real step forward. Coke breeze at one time was more or less of a waste product and commanded only a few shillings per ton, where sold. As a result of much investigation it has been found that in many cases of high volatile coals of high agglutinating properties the addition of a small percentage of finely crushed breeze to the blend greatly improves both shatter and trommel tests of the coke and at the same time disposes of the breeze at coke prices instead of at a few shillings per ton. Indeed, on some plants the whole of the fine breeze is worked up in this way, and none of it is disposed of otherwise.

With regard to the progress that has been made in modern coking practice generally in this country during the last twenty-one years and the effect of oven design upon the quantity and quality of by-products produced, very great credit is due to one of our early Presidents, Mr. Middleton, of Consett, a real pioneer in the art of coke making. It was this gentleman who, while others were hesitating and indeed afraid of moving forward, not only advocated silica construction, but built his own silica brickworks, quarried his own silica rock, and produced the bricks with which to build the first large silica battery in this country. Very great doubt as to the advisability of this venture was expressed by many at the time, but to-day silica construction has become the order of the day and the advantages thereof are no longer disputed.

As a result of this step forward in oven design the tonnage of coal carbonized per man shift to-day is about ten times what it was twenty-one years ago, while working conditions about modern plants are very greatly improved on what they used to be, and the percentage of surplus gas available for steel smelting or town use, as the case may be, has gone up appreciably.

The researches of this gentleman also at Langley Park in 1917 added greatly to our knowledge of the effect of oven top temperature upon quality and quantity of by-products produced. Prior to this date, little was known as to the cracking which took place in the gases evolved from the coal charge, in their passage to the ascension pipe, and it was the presence of high percentages of paraffins in the toluole produced by this plant which led to an investigation resulting in the ability to control the composition of the crude benzole and tar produced within very wide limits and at the same time produce naphthalene or wash oil at the naphthalene scrubber at will. This, again, was a great step forward, and to-day, as a result of this finding, we are able to say with a considerable amount of certainty what the quality of the crude benzole and tar from a plant of any particular design will be.

Another pioneer member of our Association, whose researches added greatly to our knowledge, was Mr. Ernest Bury, of Skinningrove. This gentleman set out and very nearly succeeded in the achievement of the ideal that no coal other than what is charged into the coke oven shall be used in a modern steel works. He also succeeded in producing alcohol from coal gas, but, while physically possible, this venture did not turn out to be a commercial success.

The pursuit of the ideal previously mentioned led up to the underfiring of coke ovens worked in conjunction with modern iron and steel works by blast furnace gas, and to-day the coking plant so placed is heated by blast furnace gas, leaving the whole of the coke oven gas produced available for steel smelting or other purposes.

In this connection it might be mentioned that the procedure adopted in the United States of America, when a plant is laid down more as a domestic proposition than as a cog in the wheel of an iron and steel works, of so arranging matters that the ovens can be fired in winter when the maximum coke oven gas is required, by producer gas from coke nuts accumulated in summer time when there is little or no demand for the same, and firing the ovens entirely by coke oven gas in summer time when the demand for coke oven gas is at a minimum commends itself for the consideration of owners of plants similarly situated in this country.

Modern Developments.

Hydraulic mains and ascension pipes in the early days of our Association were always a source of great anxiety and the duties of the valve man were both tiring and unpleasant. The design of the modern ascension pipe is such that it does not call for this attention, with the result that the valve man has passed out of the picture altogether. The self-sealing door also has now definitely come to stay and pug-mill men and daubers also vanish. The conveyance and quenching of coke by the electrically propelled coke car and the rubber belt conveyor is general practice

on the modern plant, resulting in the disappearance of the quencher man and in reduced costs in maintenance and operation, while the timing of the admission of water during quenching is now automatically clock controlled independent of the activity of the car man, thus largely eliminating the human element from contact with the hitherto vexed question of moisture content in coke.

Electrostatic tar precipitation was not heard of until quite recently, and the resulting benefits in the cleanliness of the sulphate and life of benzole absorbing oils are enormous. On the advent of this apparatus, tar sprays and other forms of tar extractors bid us adieu.

One of the latest developments is the modern centrifuge for sulphate. The basket of this machine revolves in a vertical plain instead of horizontally as hitherto, the salt being discharged by an automatically operated plough. By the use of this machine, one sulphate man and his assistant can easily handle ten tons of sulphate per shift.

So much for the production of our products. With regard to disposal, the demand for our main product coke is wrapped up largely in the fortunes of the iron and steel trade, while the marketing of coke nuts has made great progress of late years, so much so that many coke screening plants are so arranged that the whole of the production from the ovens can be disposed of in the domestic market, if and when required.

Sulphate of ammonia, once a very valuable source of revenue, has fallen upon evil times in late years, but can still be produced to show a profit on modern plants. The marketing of by-product sulphate, however, becomes increasingly difficult, chiefly on account of its inferior quality in many cases as compared with sulphate from other sources. I am confident, however, from such developments as are at present taking place towards the production of a better and purer crystal in coke oven sulphate, that we are within sight of holding our own in this market.

Benzole and its homologues continue to find a ready market, and the indications are that the future will call for more and more of these products. Tar is a product whose value varies more than that of any other coke oven by-product, chiefly on account of variations in pitch prices. The increasing demand for creosote oil for hydrogenation, however, and for cresylic acid should tend to maintain the value of this product.

Athletic and Social

Gloucester Sports and Social Club.

As a result of the efforts of a Management Committee a Sports and Social Club was formed this year for the benefit of the employees of the Gloucester Gas Light Company.

The Club premises, which were officially opened on Oct. 19, are fully licensed. At a subscription of twopence per week for members over the age of 18 and one penny per week for members under the age of 18, deducted from wages. Many varieties of indoor and outdoor sports are available, including cricket, angling, billiards, table tennis, &c., while whist drives and suppers are arranged.

The Club is divided into sections representing each branch of sport as may be desired and each section is under the control of its own Committee elected annually by members of the section.

Membership of the Club is open to any employee of the Gloucester Gas Light Company. It is agreed that the formation of a Sports and Social Club leads to better feeling among the employees of the Company.

Blackburn Social and Benevolent Club.

The Mayor of Blackburn (Mr. W. Coupe, J.P.) was the guest of honour of Blackburn Corporation Gas Social and Benevolent Club on Saturday, Oct. 17, when following the annual dinner he presented prizes in recent sports.

Councillor R. R. Fielding (Chairman of the Gas Committee), who presided, congratulated the men on the way they had worked not only in the field of sport but in helping to make the Department a success. At the recent trades exhibition in Blackburn the sales were a record.

Mr. George Beardwood (Secretary) reported that the Club had a membership of 230, and had a good record in sport. The billiards team finished second in the Workshops Billiards League and the bowling team third in the Workshops Bowling League. The holiday savings club disbursed £1,028 at the end of the year, and the benevolent section (begun in 1929) had paid out £800 in sick and funeral benefits.

Among guests at the dinner were Aldermen R. Culshaw and H. Watson, Councillors H. Johnson (Vice-Chairman of the Gas Committee), J. Riley, J. Grimshaw, A. Hodgkinson, W. Bond, and J. Taylor, Mr. J. D. Ashworth (Engineer and Manager), Mr. E. B. Field (Assistant Engineer), Mr. H. N. Dunn (Works Superintendent), and Mr. T. E. Richmond (Head of the Commercial Section).

The prize-winners included: Bowls, Hamer Cup, W. McGarry; six-a-side contest, P. Gannon's team; Tennis, Fielding Cup, J. Blackhurst; Cricket, batting, G. D. Humphries, bowling, R. Holden.

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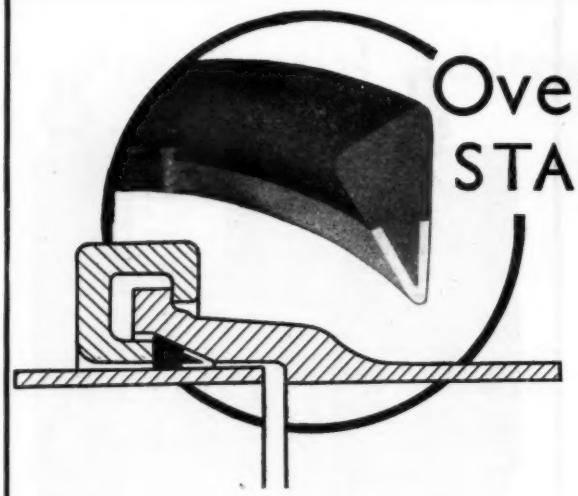

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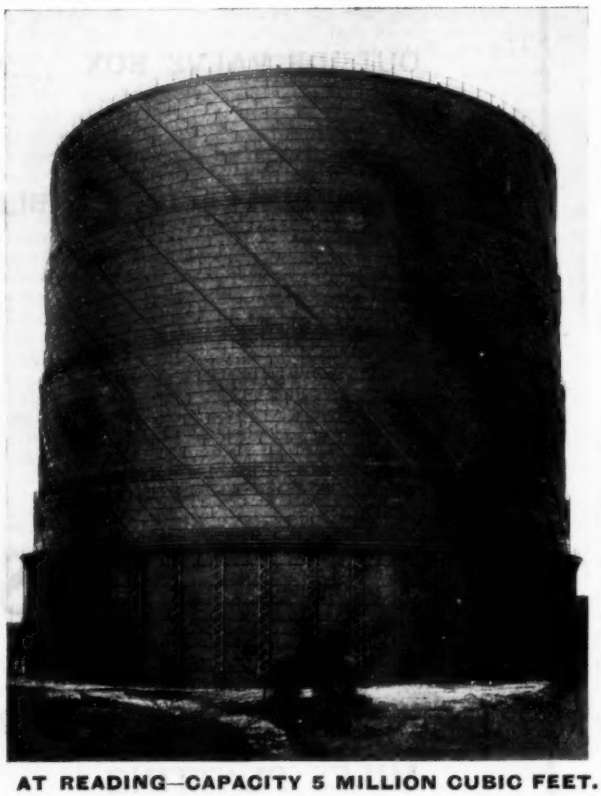

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Last week's Settlement was one of the heaviest for a long time, and in anticipation of renewed activity during the current week the "House" closed on Friday in a cheerful mood. On the whole the gilt-edged market was somewhat dull and closed fractionally lower, though Home Rails were well supported, especially Great Western and London Midland and Scottish. Many good gains were registered in the industrial section, iron and steel shares again being prominent. Rubber shares continued in good demand and coppers were active, though prices finished below the best. A feature towards the close was a revival of interest in diamond issues, and some quotations went to levels not reached for years past.

Business in the Gas Market was not quite so heavy as during the past few weeks, mainly due to a shortage of supplies, and consequently several issues recorded appreciations. On the London Exchange the feature was a sharp rise of 6 points in Alliance and Dublin to 169½. This was followed by a gain of 4 points in Oriental to 171½, while a shorter margin put Imperial Continental 3½ points higher at 163½. With regard to the latter, it became known just after the close on Friday that the interim dividend is being maintained at 4%. Montevideo strengthened 3 to 77½, and a few fixed-interest stocks also hardened. South Metropolitan, on the other hand, suffered a further relapse and closed 2 points lower at 118½. At the Provincial Exchanges the only movements occurred at Newcastle, where the local Company's units hardened 3d. and Sunderland 6% maximum rose 2 to 133. In the Supplementary List the nominal quotation of Oxford ordinary was marked up 5 points to 215.

The Directors of the Croydon Gas Company are offering for sale by tender £103,883 4% preference stock at a minimum price of £106%, yielding at this price £3 15s. 5d.%. The dividend on the preference stock, including the present issue, is covered sixteen times, and it is unnecessary in these columns to emphasize further the strength of this Company's financial position. One month's dividend on the new stock calculated to Dec. 31, 1936, of 6s. 8d.% will be paid on March 1, 1937. The last day for receipt of tenders is Tuesday, Nov. 10.

The South-Eastern Gas Corporation announce that their recent offer to the stockholders of the Uxbridge, Maidenhead, Wycombe and District Gas Company, details of which appeared in the Report of Oct. 14, has been accepted by a substantial majority.

Current Sales of Gas Products

The London Market for Tar Products.

Oct. 26.

The tar products market is quiet, prices ruling at about the following levels:

Pitch, nominal at 35s. per ton f.o.b.
Creosote, about 5½d.
Refined tar, 3¾d.
Pure toluole, 2s. 3d. to 2s. 4d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 7d.; and 90/160 pyridine, about 5s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Oct. 26.

The average prices of gas-works products during the week were: Gas-works tar, 18s. 9d. to 23s. 9d. Pitch—East Coast, 32s. to 34s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 32s. to 34s.* Toluole, naked, North, 1s. 11d. to 2s. Coal tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North. 1s. 1½d. to 1s. 2½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 5d.; low gravity, 4½d. to 4¾d. Heavy oils, in bulk, North, 5d. to 5½d. Carbolic acid 60's, 2s. 6d. to 2s. 7d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 3d. to 3½d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Oct.* 24.

Little or no change can be recorded in market conditions in this area. Prices are fairly steady and throughput is on a moderate scale.

Crude gas-works tar.—The actual value is 34s. to 35s. per ton *ex* works in bulk.

Pitch is unchanged at 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar is easy at 3d. per gallon f.o.r. for export, and 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—Throughput is disappointing and prices are therefore inclined to be easy. Specification oil, 4½d. to 4¾d. per gallon; low gravity, 4¾d. to 5d. per gallon; neutral oil, 4½d. to 4¾d. per gallon; all *ex* works in bulk.

Cresylic acid.—There is still a steady demand and with free supplies practically non-existent in this area, prices remain nominal as under: Pale, 97/99%, 2s. 4d. to 2s. 6d. per gallon; dark, 97/99%, 2s. 1d. to 2s. 3d. per gallon; pale, 99/100%, 2s. 9d. to 3s. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—The value of this is maintained at 5½d. to 6d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4½d. to 1s. 5d. per gallon, and 90/190 heavy naphtha is 11d. to 1s. per gallon.

Motor benzole is a fraction easier at 1s. 2½d. to 1s. 3d. per gallon.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, and 90/140 grade is 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 8½	to	0 9	per gallon at works
Motor ,, . . .	1 2	,,	1 2½	,, ,, ,,
90% ,, . . .	1 3	,,	1 3½	,, ,, ,,
Pure ,, . . .	1 7	,,	1 7½	,, ,, ,,

Contracts Advertised To-Day

Cookers, Fires, &c.

Belfast Gas Department. [p. 296.]

Exhauster and Steam Engine.

Rhyl Gas Department. [p. 296.]

Meters.

Belfast Gas Department. [p. 296.]

Pipes and Specials.

Clacton Gas and Water Department. [p. 296.]

Retorts.

Sidmouth Gas Department. [p. 296.]

Gas Undertakings' Results

Gas Supply Company (Melbourne).

The report of the Directors of the Gas Supply Company in their tenth annual report, covering the operations of the Company for the year ended June 30, 1936, states that the accounts for the year show a profit of £17,402, which with the amount brought forward from last accounts, £334, makes a total of £17,736, less interim dividend, at the rate of 6% per annum, paid March 26, 1936, £7,234, leaving a balance of £10,502. The Directors recommend this sum be applied as follows: Dividend at the rate of 6% per annum for the half-year ended June 30, 1936 (making 6% for the year), £8,313, transfer to provision for income-tax £1,800, carry forward £389, £10,502. The volume of gas sold was 13% more than last year, or 82% more than for the year ended June 30, 1932. The number of new services connected for the year was 532 (compared with 519 last year). The number of new appliances connected was 2,238 (compared with 2,157 last year). During the year prices of gas have again been reduced. Considerable extensions of plant have been carried out, particularly at Cairns, Mackay, Albury, Stawell, Ararat, and Bacchus Marsh, to meet the increased demand for gas.

Inverbervie.

Provost Rev. Neil M'Gill, Convener of the Inverbervie Gas Committee, reported at the Town Council on Oct. 19 that after placing £191 to a sinking fund there was a profit on the Gas Undertaking of £142. There was an increased consumption of gas.

Milnthorpe.

The Directors of the Milnthorpe (Westmorland) Gas Company report a satisfactory year's work, the increase in output being 183,000 cu.ft., bringing the total annual consumption to over the five million mark. The sale of cooking and other appliances was also a record. A dividend of 5% was declared and £100 was transferred to the reserve fund.

● *Apply* **SCIENTIFIC CONTROL** *to the best advantage by adopting*

THE WEST SYSTEMS

OF MODERN GAS AND COKE PRODUCTION

The West organization has co-operated with progressive Gas Undertakings in 24 countries in their schemes of works modernization, plant renewal, and extension.

- GLOVER-WEST VERTICAL RETORTS
- WESTVERTICAL CARBONIZING CHAMBERS
- BREEZE-FIRING PRODUCER EQUIPMENT
- WASTE-HEAT RECOVERY PLANTS
- THE WEST LIP-BUCKET CONVEYOR WITH AUTOMATIC LUBRICATION
- COKE GRADING AND PREPARATION UNITS

Contracts placed with West's Gas Improvement Company, Ltd., during the present year have included carbonizing plant installations for the Gas Undertakings of *Altrincham, *Bilston, *Carlisle, *Dudley, *Worcester, and *Yeadon, in England ; *Dumbarton, *Grangemouth, and Kelso, in Scotland; *Ballymena, in Ireland, and *Johannesburg, in South Africa.

* Repeat orders

WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER: ALBION IRONWORKS, MILES PLATTING — 'Phone: COLLYHURST 2961 : 'Grams: "STOKER, MANCHESTER"

LONDON: COLUMBIA HOUSE, ALDWYCH, W.C. 2 — 'Phone: HOLBORN 4108 : 'Grams: "WESGASCO, ESTRAND, LONDON"

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Oct. 23.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Sept. 7	7⅞	8	Alliance & Dublin Ord. ...	167—172	+6	170½—172
374,000	,,	June 22	4	4	Do. 4 p.c. Deb. ...	94—99	...	...
557,655	,,	Aug. 10	7	7	Barnet Ord. 7 p.c.	167—172	...	...
300,000	I	Oct. 5	1/9⅜	1/4⅜	Bombay, Ltd.	26/—28/-	...	...
179,305	Stk.	Aug. 10	9⅛	9⅛	Bournemouth sliding scale ...	220—230	...	...
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	168—173	...	172½
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	148—153	...	...
50,000	,,	June 22	3	3	Do. 3 p.c. Deb. ...	84—89	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
357,900	,,	Aug. 10	7½	7½	Brighton, &c., 6 p.c. Con. ...	168—173	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	153—158	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	145—150	...	145½
855,000	,,	Oct. 5	8	7	British Ord.	155—160	...	157—160
100,000	,,	June 8	7	7	Do. 7 p.c. Pref.	151—156	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	108—113	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—115	...	...
200,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—102	+2½	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	30 -
100,000	10	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	June 22	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	July 20	6	6	Cardiff Con. Ord.	128—133	...	...
237,860	,,	June 8	5	5	Do. 5 p.c. Red. Deb.	108—113	...	...
609,204	I	Oct. 5	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/6—19/6	...	...
296,053	I	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	21/—23/-	...	...
1,775,005	Stk.	Aug. 10	5	5	Commercial Ord.	95—100	...	94
620,000	,,	June 8	3	3	Do. 3 p.c. Deb. ...	84—89	...	86½
286,314	,,	Aug. 10	5	5	Do. 5 p.c. Deb. ...	122—127	...	124½—125½
807,560	,,	Aug. 10	7	7	Croydon sliding scale ...	158—163	+1	160¾
644,590	,,	,,	5	5	Do. max. div.	115—120	...	...
620,385	,,	June 22	5	5	Do. 5 p.c. Deb.... ...	125—130	...	128—128¼
239,000	,,	Aug. 10	5	5	East Hull Ord. 5 p.c.... ...	108—111	...	...
184,555	,,	Aug. 10	6	6	East Surrey Ord. 5 p.c. ...	128—133	...	...
176,211	,,	June 8	5	5	Do. 5 p.c. Deb. ...	123—128	...	126
250,000	I	June 22	4	6	Gas Consolidation Ord. ...	20/6—22/6	...	...
250,000	I	May 18	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/-	...	...
19,284,128	Stk.	Aug. 10	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	27/—28/-a	...	27/1½—27/7
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	89—92	...	91—92
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	105—109	...	107—108½
8,602,497	,,	May 18	3	3	Do. 3 p.c. Con. Deb. ...	87—90	...	88—89½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	117—120	...	118½—119
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	115—118	...	117
700,000	,,	Sept. 7	...	25/5§	Do. 3½ p.c. Red. Deb. ...	102—104	...	...
270,466	,,	Aug. 24	6	6	Harrogate New Cons. ...	128—133	...	...
213,200	,,	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	133—138	...	...
5,600,000	,,	May 18	8	12	Imperial Continental Cap. ...	161—166	+3½	157—166
223,130	,,	July 20	3½	3½	Do. 3½ p.c. Red. Debs.	92—97	...	94½
285,242	,,	Aug. 24	8½	8½	Lea Bridge 5 p.c. Ord. ...	172—177	...	...
11,751	,,	,,	10	8	Maidstone Gas 5 p.c. Cap. Stk.	190—200	...	...
63,480	,,	June 22	3	3	Do. 3p.c.Prp.Db.Sk.	80—85	...	...
75,000	,,	May 18	†10	†10	Malta & Mediterranean ... Metropolitan (of Melbourne)	190—200	...	...
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100—105	...	...
231,978	Stk.	Aug. 24	5	5	M.S. Utility 'C' Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	105½—106½
360,075	,,	June 22	4	4	Do. 4 p.c. Deb. ...	104—109	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	122—127	...	127
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	Stk.	June 22	†3	†6	Montevideo, Ltd.	75—80	+3	...
225,000	,,	Aug. 10	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	...
396,160	,,	Aug. 10	5	5	Northampton 5 p.c. max. ...	110—115	...	111½
300,000	,,	Apl. 20	†9	†7	Oriental, Ltd....	169—174	+4	172
416,617	,,	June 8	8	8	Plymouth & Stonehouse 5 p.c.	168—173	...	...
504,416	,,	Aug. 10	8½	8½	Portsmouth & Gosport Cons.	170—175	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	113—118	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	118—123	...	...
114,000	,,	July 20	5	5	Preston 5 p.c. Pref.	110—115	...	...
363,470	I	Sept. 21	1/-	1/-	Severn Val. Gas Cor. Ld. Ord.	21/—23/-	...	22/9—23/-
454,510	I	,,	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	21/—23/-	...	22/3
133,201	Stk.	Aug. 24	5	8⅛	Shrewsbury 5 p.c. Ord. ...	145—150	...	...
90,000	10	June 8	†3½	†4	South African... ...	4—5	...	...
1,152,635	I	Sept. 7	1/2⅝	1/2⅜	South East'n Gas Cn. Ld. Ord.	26/—29 -	—/6	28/—28/6
845,511	I	,,	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	21/—23/-	...	21/9
200,000	I	,,	4	4	Do. 4 p.c. Cum. Pref. ...	20 6—21/6	...	21/6
450,000	Stk.	Aug. 10	4	4	Do. 4 p.c. Red. Deb. ...	103—105	+2½	103¾—104½
150,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb. ...	100—102	...	...
6,709,895	,,	Aug. 10	6½	5	South Met. Ord.	117—120	—2	116½—119½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf....	145—150	...	...
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf....	104—107	...	105—106½
1,895,445	,,	June 22	3	3	Do. 3 p.c. Deb. ...	87—90	...	...
1,000,000	,,	July 6	5	5	Do. 5 p.c. Red. Deb.	114—117	...	116½—117
1,543,795	,,	Aug. 10	6	6	South Suburban Ord. 5 p.c....	130—135	...	...
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	122—127	...	123—124
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	102—107	...	...
888,587	,,	June 8	5	5	Do. 5 p.c. Deb....	123—128	...	...
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	102—107	...	...
427,859	I	May 4	9⅜	1/2⅜	S. Western Gas & Water Ord.	21/6—23/6	...	22/3—22/10½
160,523	I	Oct. 19	-/10⅛	-/10⅛	Do. 4½% Red. Cum. Pref.	20/6—22/6*	—/6	...
110,000	Stk.	June 22	4	4	Do. 4% Red. Deb. ...	100—105	...	...
647,740	,,	Aug. 10	5	5	Southampton Ord. 5 p.c. ...	112—117	...	...
121,275	,,	June 8	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Aug. 10	5½	5½	Swansea 5½ p.c. Red. Pref. ...	109—114	...	...
106,000	,,	June 8	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—101	...	...
94,000	,,	,,	§35/-	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Aug. 10	6⅜	6⅜	Tottenham and District Ord.	152—157	...	153—155½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	128—133	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
371,850	,,	June 8	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
369,774	,,	Aug. 10	7	7	Uxbridge, &c., 5 p.c. ...	165—175	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	122
1,340,521	,,	Aug. 10	7	7	Wandsworth Consolidated ...	159—164	...	162—164
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	126
500,000	,,	,,	...	...	Do. 4 p.c. Pref. ...	104½—107½	...	...
1,317,964	,,	June 8	5	5	Do. 5 p.c. Deb. ...	127—132	...	...
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	106
499,735	,,	Aug. 10	7½	7	Watford and St. Albans Ord.	155—160	...	...
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	131—136	...	...
200,000	,,	June 22	4	4	Do. 4 p.c. Red. Deb.	100—105	...	...
100,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb.	99—102	...	...
158,400	,,	Aug. 24	6b	5⅜	Winchester W. & G. 5 p.c. Con.	120—125	...	...

a.—The quotation is per £1 of Stock. b.—Paid £3, including 10s. on account of back dividends. * Ex div.
† Paid free of income-tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.

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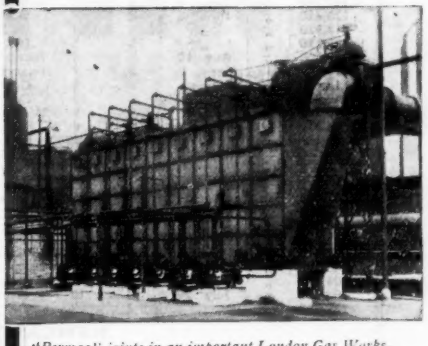
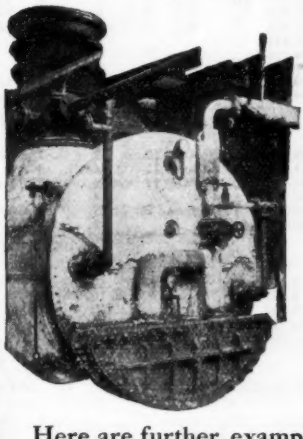
METAL-TO-METAL JOINTING MATERIAL.
by its Results!



"Permac" joints in an important London Gas Works.



"Permac" Joints on a Benzol Rectification Still.

Here are further examples of "Permac" Joints. All over the country "Permac," the metal-to-metal jointing material, is preferred by Engineers who have similar severe conditions to deal with. Over 25 years it has stood the test.

"Permac" stands up to all temperatures and pressures, and is equally successful on every kind of joint—steam, gas, oil, bye-product.

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There are many low-priced imitations—old and new—on the market. They are also low in quality.

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STOCK AND SHARE LIST— Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Oct. 23.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	July 20	6	5	Bath Cons.	122½—124½	...	...
1,667,250	,,	July 6	5	5	Bristol, 5 p.c. max. ...	120—122	...	...
120,420	,,	June 8	4	4	Do. 1st 4 p.c. Deb. ...	101½—103½	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101½—103½	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	124—127	...	...
274,000	,,	Aug. 10	5	5	Newport (Mon.) 5 p.c. max....	110—114	...	...
13,280	12	Sept. 7	8½	7	Pontyp'l Gas & W. 10 p.c. 'A.'	13½—14½	...	...
13,600	10	,,	6	5	Do. 7 p.c. 'B.'	12—12½	...	...
40,000	10	,,	6	5	Do. 7 p.c. 'C.'	12—12½	...	...
140,778	Stk.	Aug. 10	5	5	Weston-super-Mare Cons. ...	112—114	...	...
64,338	,,	June 22	4	4	Do. 4 p.c. Deb.	100—102	...	...
38,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	163—166	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Aug. 10	6½	5	Chester 5 p.c. Ord.	107—112	...	...
92,500	,,	June 8	4	4	Do. 4 p.c. Pref.	98—102	...	...
32,340	,,	,,	3½	3½	Do. 3½ p.c. Deb. ...	90—95	...	...
41,899	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	135—137	...	...
245,800	,,	June 22	5	5	Do. 5 p.c. Red. Pref ...	103—108	...	...
306,083	,,	July 6	4	4	Do. 4 p.c. Deb. ...	104—106	...	...
106,280	,,	July 20	10	10	Preston 'A' 10 p.c. ...	198—208	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	137—147	...	...
NEWCASTLE EXCHANGE.								
122,877	Stk.	Aug. 10	8	8	Blyth 5 p.c. Ord.	153—155	...	...
732,900	,,	Aug. 10	5	5	Hartlepool G. & W. Co. & New	124—126	...	...
2,061,315	,,	Aug. 10	5½	5	Newcastle & Gateshead Con.	28/—28/6a	+/3	...
692,886	,,	,,	4	4	Do. 4 p.c. Pref. ...	103—105	...	...
776,704	,,	June 22	3½	3½	Do. 3½ p.c. Deb. ...	99—101	...	...
277,285	,,	May 4	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
209,820	,,	Aug. 10	8½	8½	South Shields Con.	172—174	...	...
299,342	,,	Aug. 10	6	6	Sunderland 6 p.c. max. ...	132—134	+2	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 10	10	7	Derby Con.	185—190	...	...
55,000	,,	June 22	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	June 8	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,008	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,806,339	,,	Aug. 24	6	6	Sheffield Cons.	145—147	...	...
95,000	,,	July 6	4	4	Do. 4 p.c. Deb.... ...	102—105	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Sept. 7	...	5	Ascot Ord.	120—125	...	...
128,182	,,	July 6	...	5	Do. 5 p.c. Pref.	115—120	...	...
238,631	1	June 8	5	5	Assd. Gas and Water Ord....	21/—23/-	...	...
323,681	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	21/6—23/6	...	...
150,000	Stk.	Sept. 21	...	3½	Do. 3½ p.c. Red. Deb. ...	98—101	...	...
17,000	,,	Aug. 24	8	8	Bognor Orlg. Ord. 'A' ...	175—185	...	...
42,210	,,	,,	8	8	Do. New Addl. 'A' ...	175—185	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	145—150	...	...
37,440	,,	Aug. 10	10	10	Cam.Univ. & Town 10 p.c.max.	205—215	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	155—160	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	108—113	...	...
65,000	,,	Aug. 10	8½	7½	Eastbourne 'A' 5 p.c. ...	175—180	...	...
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	142—147	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
130,000	,,	June 22	5	5	Do. 5 p.c. Deb.	124—129	...	125
24,000	30	Aug. 10	8½	8½	Great Yarmouth 8½ p.c. max.	51—56	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.... ...	42—45	...	...
51,160	Stk.	June 8	5½	5½	Do. 5½ p.c. Deb.... ...	123—128	...	...
152,600	,,	Sept. 7	8	8	Guildford Cons.	182—192	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	114—119	...	...
68,250	,,	June 8	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Aug. 24	7½	7½	Hampton Court Cons. ...	173—178	...	...
107,960	10	Oct. 5	5½	4	Mid Kent Ord.	10—11*	...	...
230,940	Stk.	Aug. 10	10	10	Oxford & District Ord. ...	210—220	+5	216½—218½
47,112	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pre ...	113—118	...	...
126,193	,,	May 18	7½	7½	Peterborough Ord.	160—170	...	...
64,990	,,	Sept. 7	6½	7½	Redditch Ord.	133—143	...	...
166,850	,,	Aug. 10	9	8	Romford Ord.	168—178	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Sept. 21	5	5	Do. 5 p.c. Deb.	120—125	...	...
10,950	,,	Aug. 24	8	8	Ryde Ord.	165—170	...	...
136,191	,,	Aug. 10	7	5	Scarborough Ord.	126—136	...	...
27,825	,,	Aug. 24	8	8	Shanklin & Ventnor Cons. ...	180—190	...	...
40,643	,,	Sept. 21	7	7	Slough Ord.	156—161	...	...
221,000	,,	June 22	5	5	Do. 5 p.c. Deb.	116—121	...	...
28,872	1	May 4	5½	5½	S. Midland Gas Cpn.Ltd. Ord.	22/6—24/6	...	...
28,866	1	Sept. 7	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	22/—24/-	...	...
137,730	Stk.	Aug. 10	7	7	Southgate & Dist. 7 p.c. max.	151—156	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	...
117,228	,,	Aug. 10	6	5	Swindon Cons.	110—115	...	...
60,425	,,	June 22	5	5	Do. 5 p.c. Deb.	120—125	...	...
64,380	,,	June 8	5	5	Torquay and Paignton 5 p.c. Pf.	117—122	...	...
750,000	1	Oct. 5	5·52d.a	4	Utd. Kingdom Gas Cpn. Ord.	21/—22/-*	...	21/3—21/9
468,574	1	,,	2½	2½	Do. 4½ p.c. Prefd. Ord....	20/—22/-*	...	...
935,902	1	May 18	2½	4½	Do. 4½ p.c. Cum. Pref. ...	21/—23/-	...	22 3—23/3
600,000	Stk.	Sept. 21	3½	3½	Do. 3½ p.c. Red. Deb. ...	97—100	...	1[illegible]...
130,000	,,	Aug. 10	8	5	Wakefield Ord.	140—145	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	105—110	...	...
82,000	,,	July 20	6	6	Weymouth Ord.	105—110	...	...
98,384	,,	Aug. 10	6	6	Wolverhampton 6 p.c. Pref.	127—132	...	...
160,000	,,	June 8	5½	5½	Do. 5½ p.c. Rd. Db	107—112	...	...
370,000	,,	July 20	6	4	York Cons.	111—116	...	...
90,000	,,	June 22	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...	...
133,640	,,	July 20	6½	6½	Yorkstown (Cam.) 5 p.c. Cons.	130—135	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	118
35,000	,,	June 22	5½	5½	Do. 5½ p.c. Deb.... ...	130—135	...	135

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